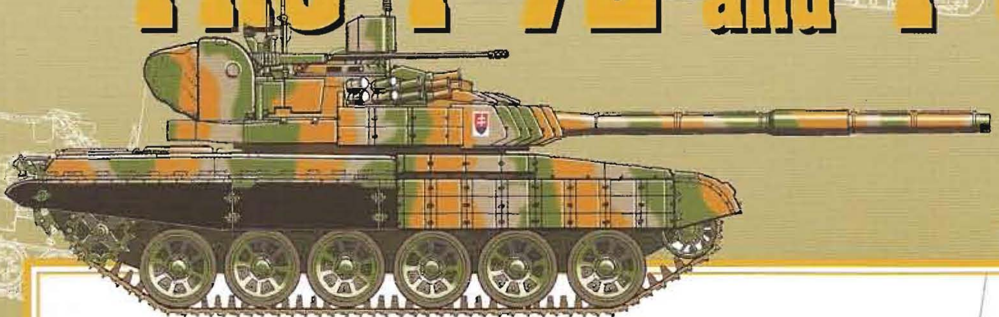
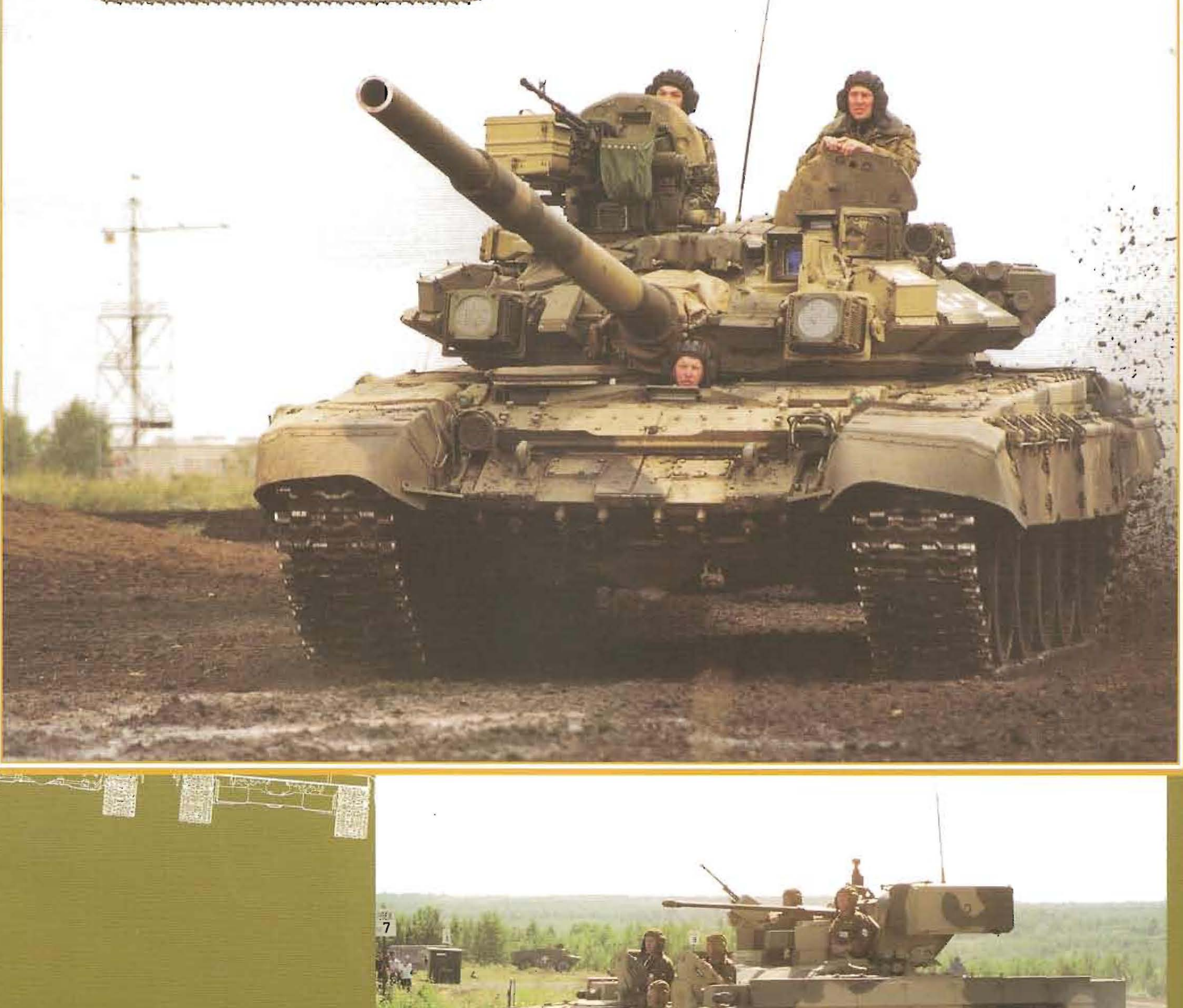
MINI COLOR SERIES

7508

The T-72 and T-90 Tank

Steven Zaloga and David Markov





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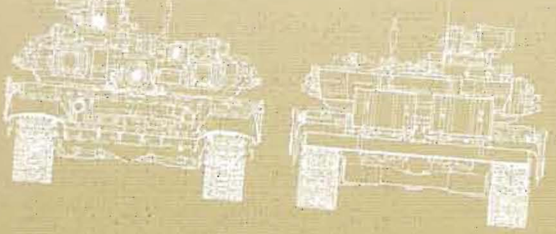
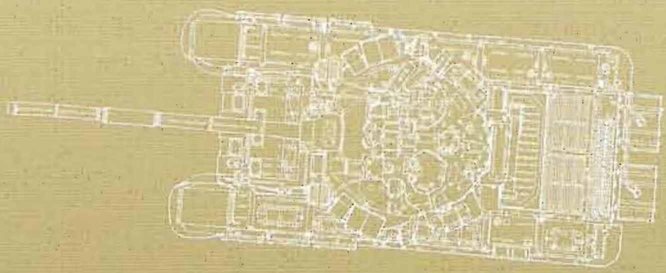
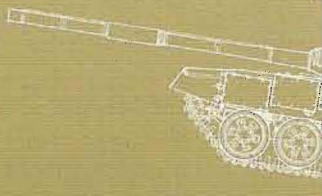
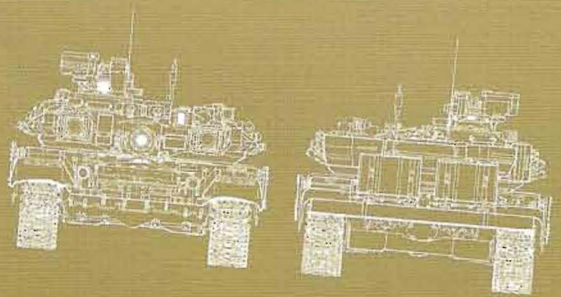
The T-72 and T-90 Tank

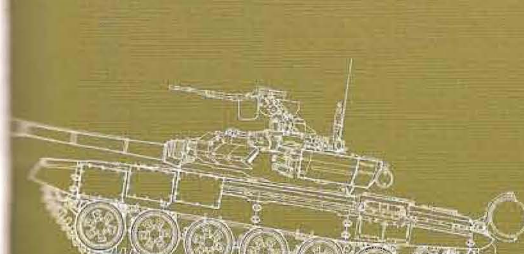
Text by Steven Zaloga & David Markov
Illustrations by Steven Zaloga











Introduction

This book is a follow-on to an earlier Concord book (No. 1004) on the T-72 that was published in 1989. This book brings the story of the T-72 up-to-date by covering the many new versions of this famous tank.

The T-72 is the most widely produced main battle tank in the world today, and is being manufactured in five countries. Due to such a widespread production base stretching from Croatia to India, a remarkable number of variants of the T-72 are being manufactured. This book covers the new main battle tank variants as well as some of the newer and more interesting combat support vehicles based on the T-72 chassis.

Russia

After the break-up of the Soviet Union in 1991, Russia was left with the main T-72 production facility in Nizhni-Tagil. It first began trying to export an improved version of the T-72B, called the T-72S Shilden (Shield), which had an uprated engine and could fire the Svir guided projectile. Although some T-72S were exported to countries such as Iran, the T-72 received a blow to its prestige due to the poor performance of the T-72 in the 1995 Chechen war. In fact, tactics were more to blame than the T-72's technology in Chechnya. In view of the bad reputation that the T-72 had received in the 1991 Gulf War and in Chechnya, the Nizhni-Tagil plant decided to rename the newest version of the T-72 as the T-90. The T-90 introduced a host of improvements to the fire control system, as well as the new Shtora self-defense system. In 1999, an improved version with a welded turret was introduced, the T-90M. Nizhni-Tagil is now working on future tank test-bed, sometimes called the T-95, based on T-72 components. However, for the near term, the T-90 will remain the Russian Army's best main battle tank.

The Chechen wars have convinced the Russian Army of the need for a new category of combat vehicle, the urban assault vehicle, or BMPT. This switches the emphasis in the armament from fighting tanks to fighting guerillas in built-up urban areas. So the 125mm main gun has been given up in favor of a 30mm autocannon on an overhead weapon station, supplemented by three 30mm automatic grenade launchers, and a Kornet missile launcher capable of firing the devastating new thermobaric fuel-air-explosive warheads. These warheads, after penetrating into a room, spray the insides with a metallic powder which is then detonated, using the oxygen inside the structure to create a massive blast, and causing massive destruction.

The T-72 has spawned a wide variety of special purpose vehicles including the BMR-3 mine-clearing vehicle, IMR-2M combat engineer vehicle, MTU-72 bridgelayer, and BREM-1 armored repair and recovery vehicle. Most of these are based on the T-72S or T-90 chassis, using the uprated 840 hp engine.

Ukraine

Although Ukraine does not manufacture the T-72, it's tank industry has recognized that there are so many T-72s in service world-wide that there is a market for T-72 upgrades. Many of the Ukrainian proposals revolve around the excellent 6TD engine which powers the T-80UD tank. Besides this, the Ukrainians have cooperated with a number of international firms to offer packages with added armor, better fire controls and other improvements such as the T-72 Banan, the T-72AG and the T-72MP. The most radical of the upgrades is the T-72-120 which replaces the 125mm gun with a NATO-compatible 120mm gun with a new bustle autoloader.

Poland

Poland is the largest manufacturer of the T-72 outside of Russia, and in fact manufactured many of the T-72Ms used by Iraq in the 1991 Gulf War. In the early 1990s, the Polish Bumar-Labedy plant developed the PT-91 Twardy (Tough) which was intended to give the T-72 the performance of the more expensive Soviet T-80U tank but using local components. Although a small number of these were built and put into service, the Polish defense budget prevented continued manufacture. Instead, the Polish Army is modernizing existing T-72 tanks into the new T-72M1Z configuration using the features of the PT-91. Poland had plans to field a new tank called Goryl (Gorilla) based on the T-72 but with a new turret and 120mm gun somewhat like the Ukrainian T-72-120. However, given its other budget priorities, this has been placed on hold.

Slovakia

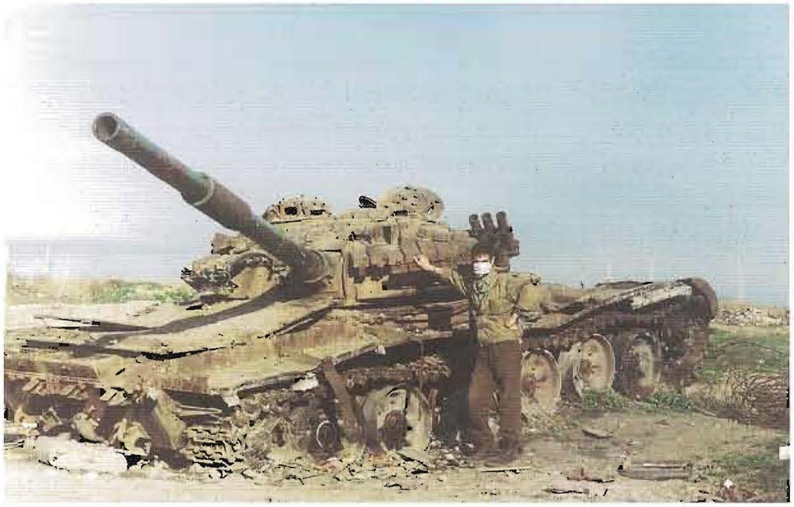
Slovakia inherited the Czechoslovak tank industry when the country split up. The Martin plant has been developing an upgraded T-72 called the T-72M2 Moderna, but has had a hard time getting enough government funding to begin series production. Slovakia has developed a number of T-72 upgrade packages hoping to attract foreign clients. The Czech Republic has no plans to restart tank production, but plans to rebuild its T-72 force in the new T-72M4 configuration.

India

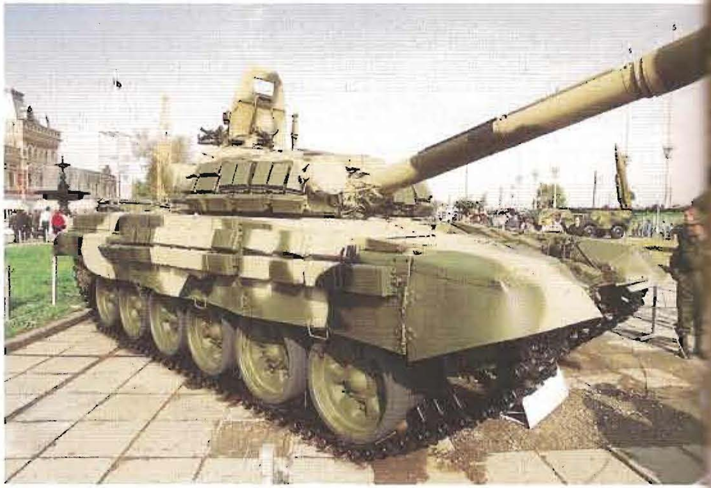
India manufactures the T-72M1 under license at Avadi, and in 1999 began negotiations to acquire the T-90. The first batch will come from Russia, and be followed by license production. These may be the basic T-90S or the improved T-90M. India produces a number of T-72 variants including a bridge-layer, and hopes to adopt a new self-propelled 155mm gun based on the T-72 chassis.

Croatia

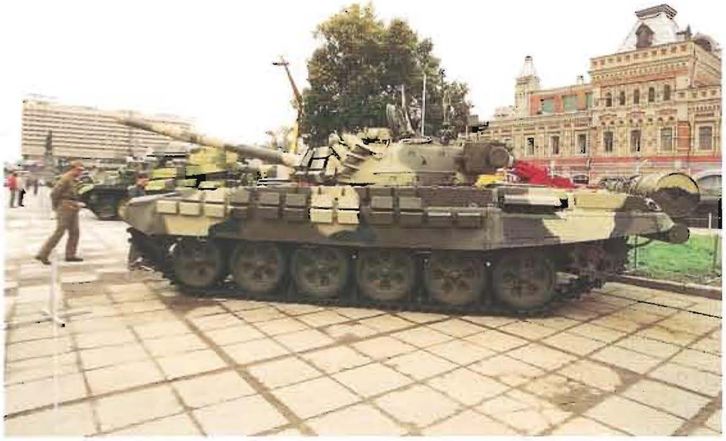
Croatia inherited much of the old Yugoslav tank industry. It re-established tank production with the M-84A4 Snajper, and has developed a substantially new T-72 derivative called the Degman with a new welded turret.



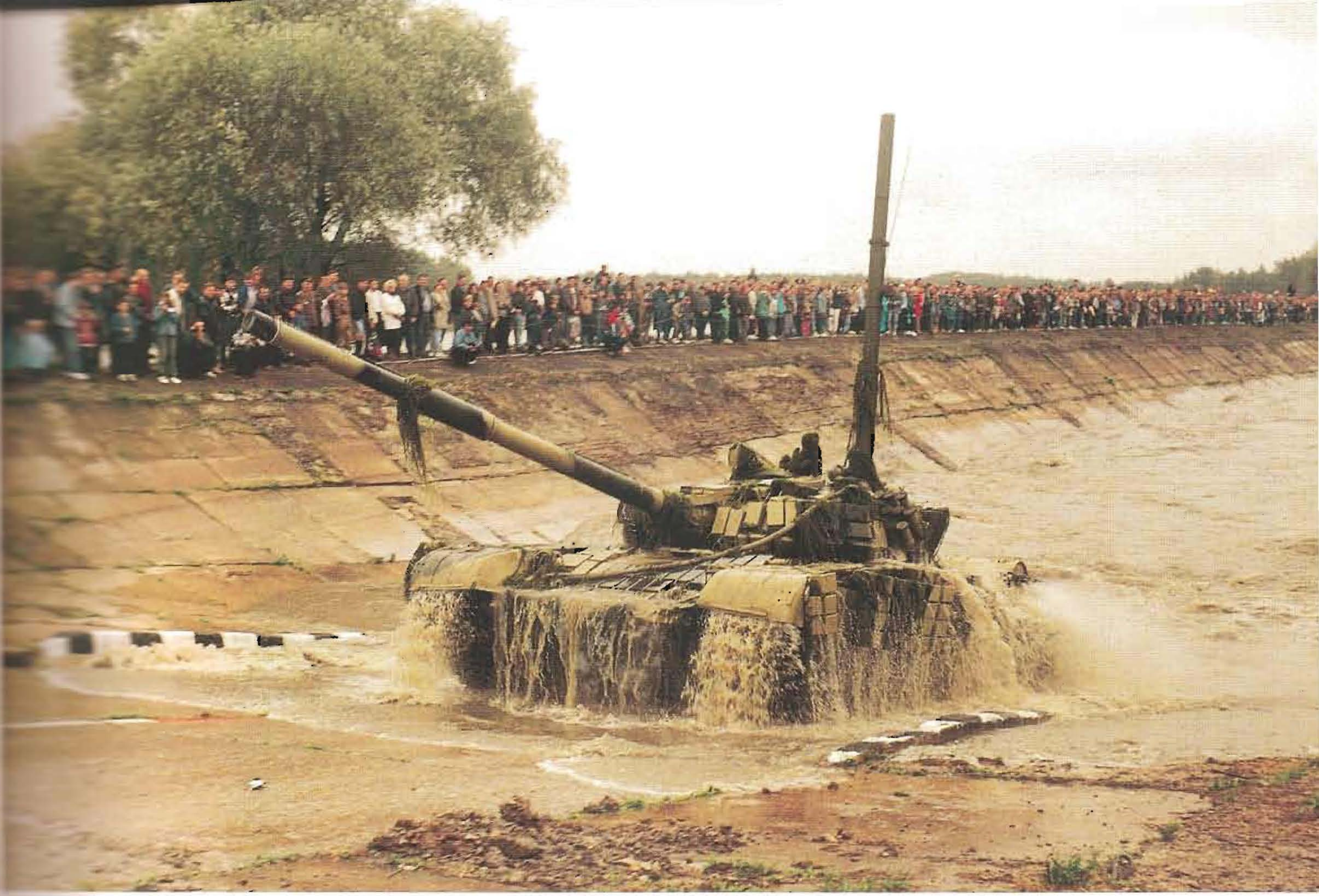
The shortcomings of the T-72 became evident in the first Chechen w in December 1995. This T-72A was knocked out near Grozniy. Althou many Russian T-72 tanks were fitted with the boxes for Kontakt explos reactive armor (ERA), in the haste to deploy units, the explosive inserts we often not fitted. As a result, many tanks were knocked out that mig otherwise have survived.



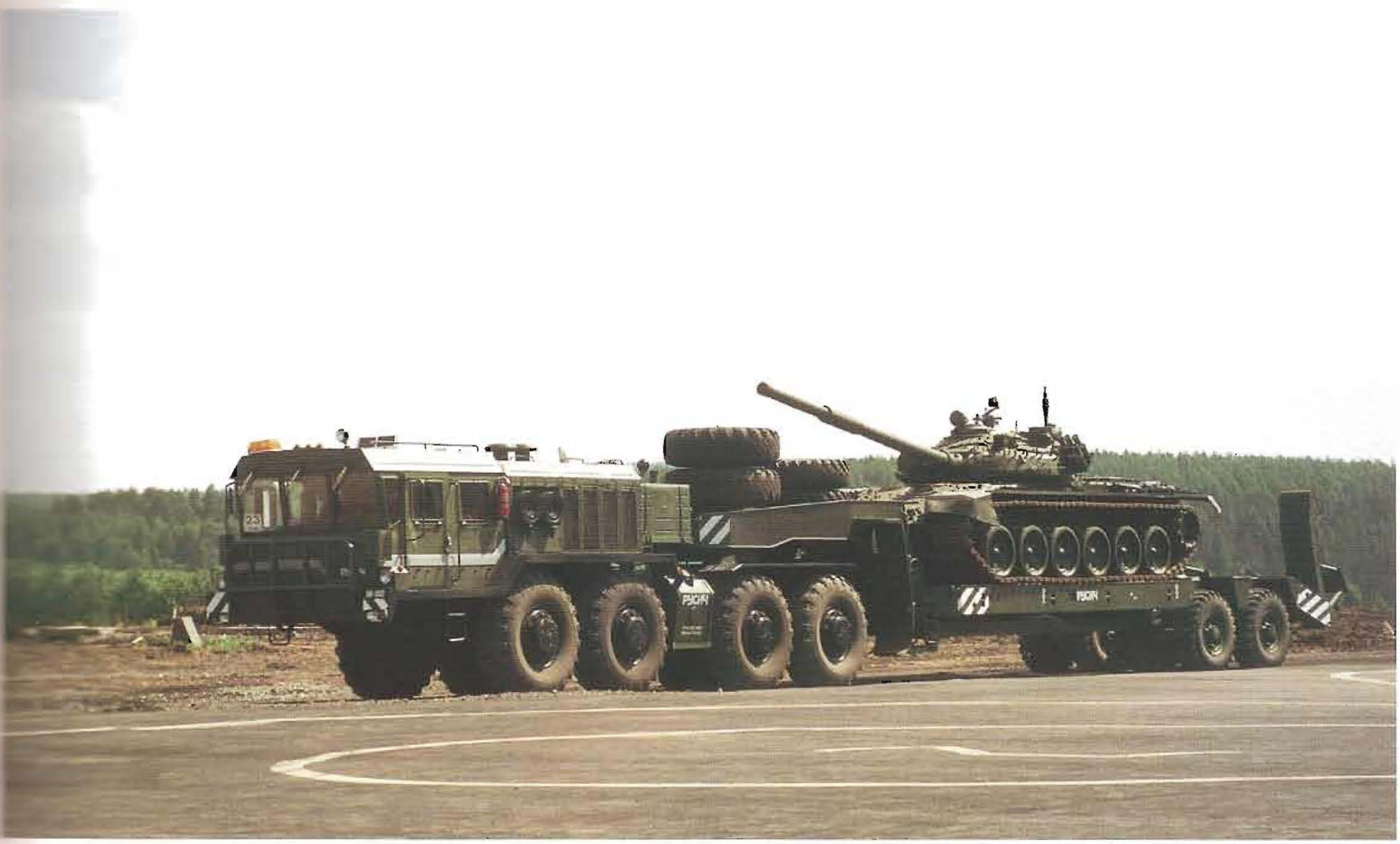
The first major T-72 variant to emerge in the 1990s was the T-72S Shilden. This was not intended for the Russian Army, but for export. The T-72S combined the basic T-72B with a variety of upgrade packages, including the capability to fire the 9M120 Svir missile. This Shilden is on exhibit in Nizhniy Novgorod in 1994.



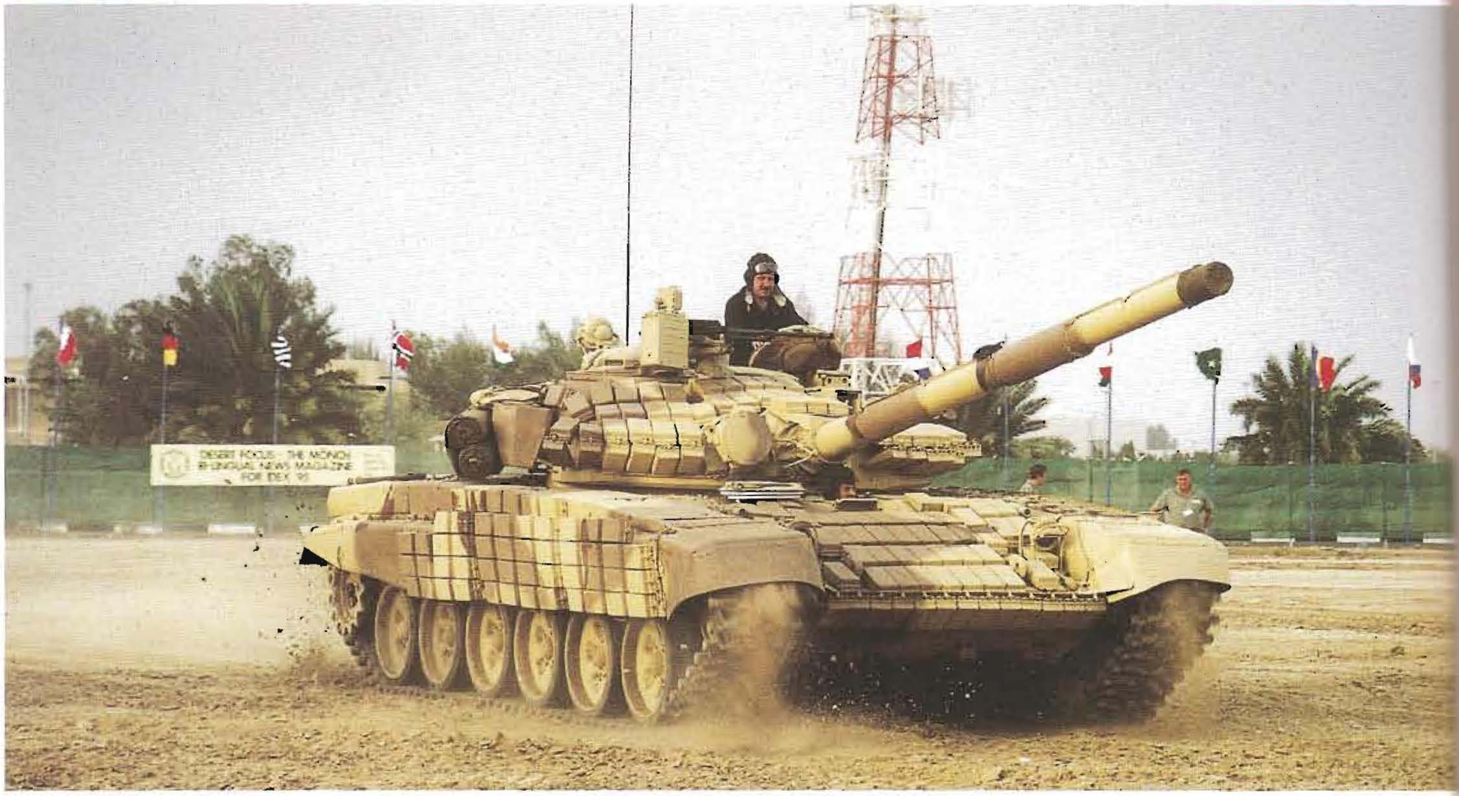
A side view of the T-72S Shilden in Nizhniy Novgorod. This version normally fitted with the initial type of NII Stali Kontakt explosive react armor panels, evident on the hull side. This version of the T-72 has been so to Iran.



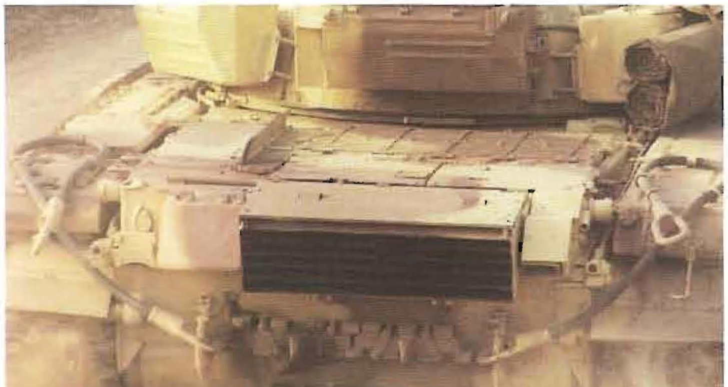
A T-72S emerges from a water obstacle at the main Russian armored development center at Kubinka, near Moscow. The snorkel provides air to crew.



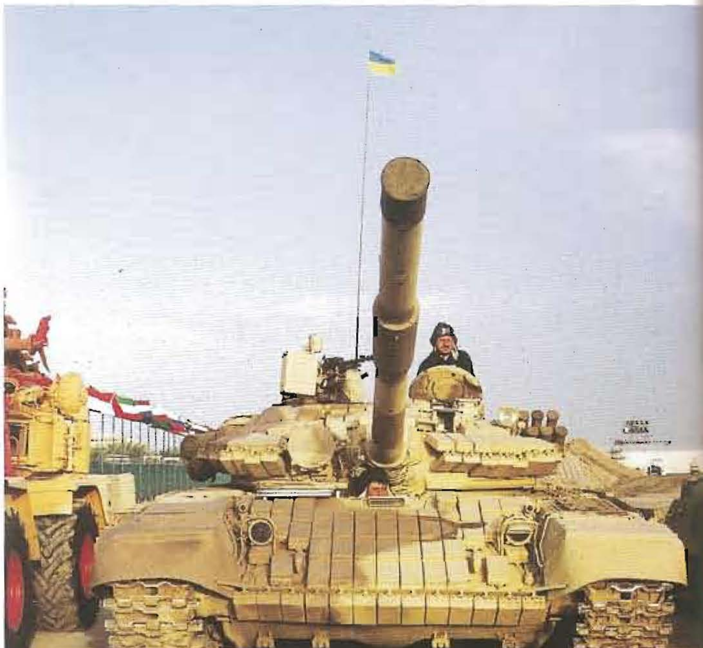
The Russian Army has begun to adopt a new family of heavy trucks for support roles. This is the new tank transporter consisting of the Rusich KZKT-74281 tractor and a KZKT-9102 semi-trailer. In this case, the load is a T-72B fitted for Kontakt ERA panels which are not fitted.



Ukraine does not manufacture the T-72 tank, but in the early 1990s, decided to get involved in the T-72 upgrade business. This is one of the first upgra packages offered, the T-72 Banan (Banana). This is aimed at improving the automotive performance of the T-72 by substituting a 6TD-1 or 6TD-2 die engine. The tank used for the conversion was a standard T-72A (T-72M1).

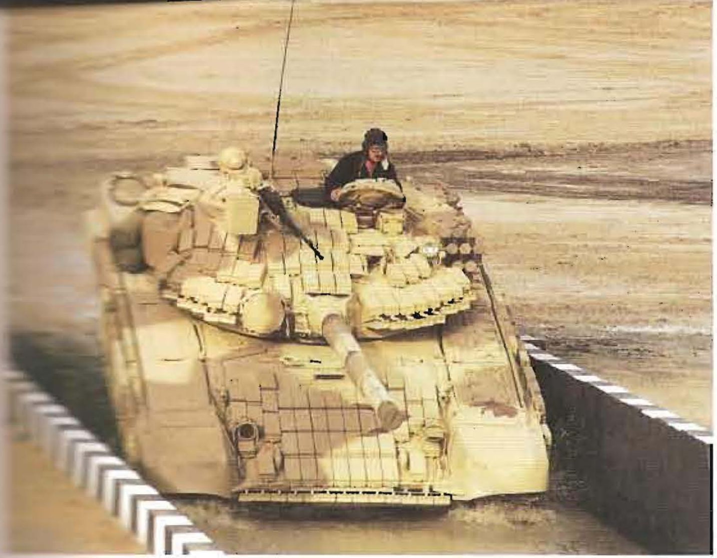


The most obvious difference from the Ukrainian T-72 upgrades and the original T-72 is the engine deck area. This looks similar to the deck on the T-64B or T-80UD, since it uses a related 6TD diesel engine.

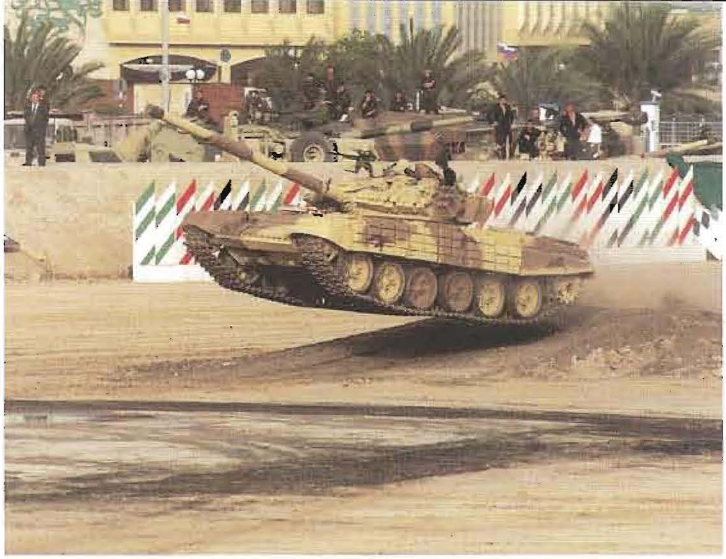


This head on view of a T-72 Banan shows some of the other change on the vehicle, including the altered form mudguards that resemble th pattern on the T-90.

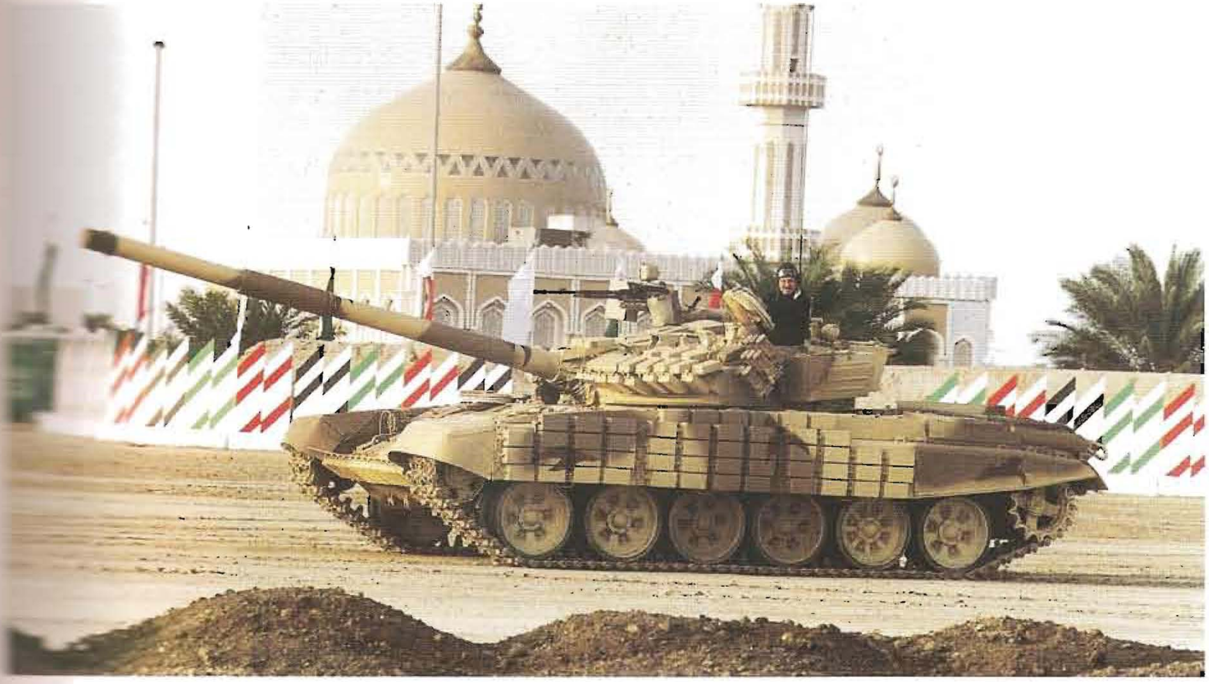
The reactive armor package on the T-72 Banan is different than th usual Russian pattern. There have been three generations of Kontakt, usin



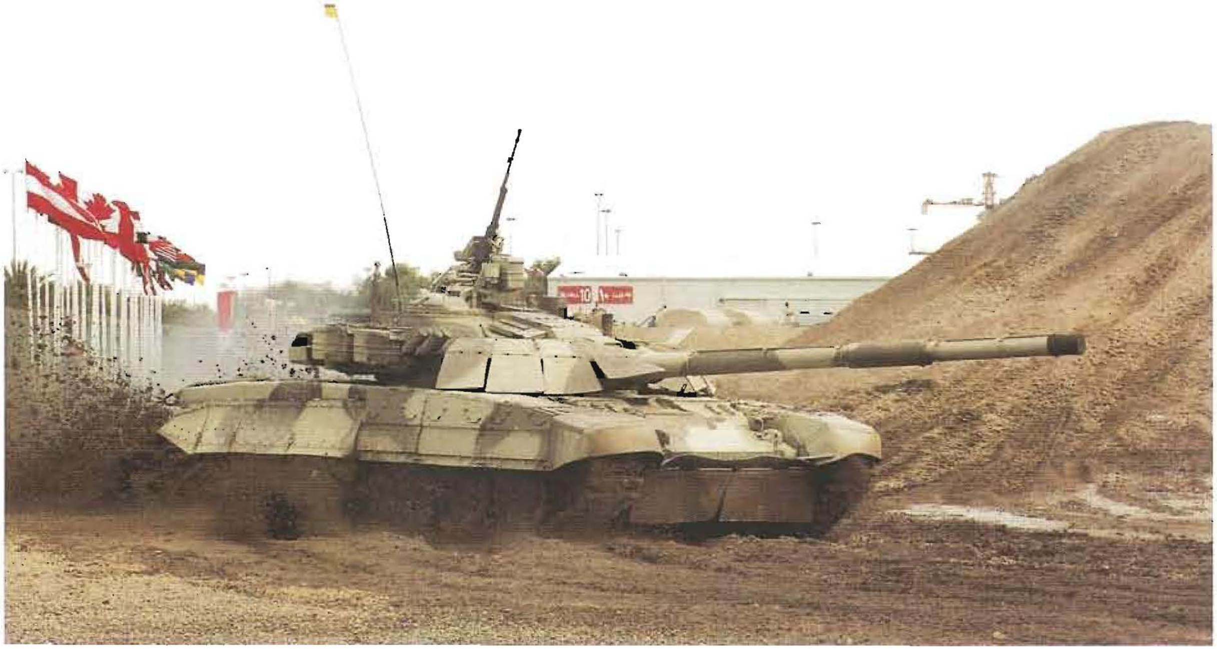
A T-72 Banan approaches a water obstacle during trials in the United Arab Emirates. This provides a good overview of the layout of the Kontakt ERA bricks on the turret roof, intended to protect the tank from top-attack smart munitions and missiles.



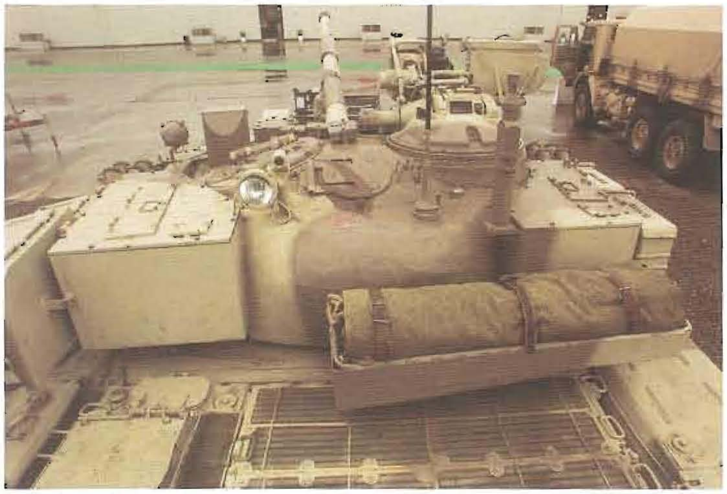
The new 6TD engine in the T-72 Banan increased the vehicle power by 35%, which makes the T-72 a peppy performer. Here, one leaps over an obstacle during a demonstration in the United Arab Emirates.



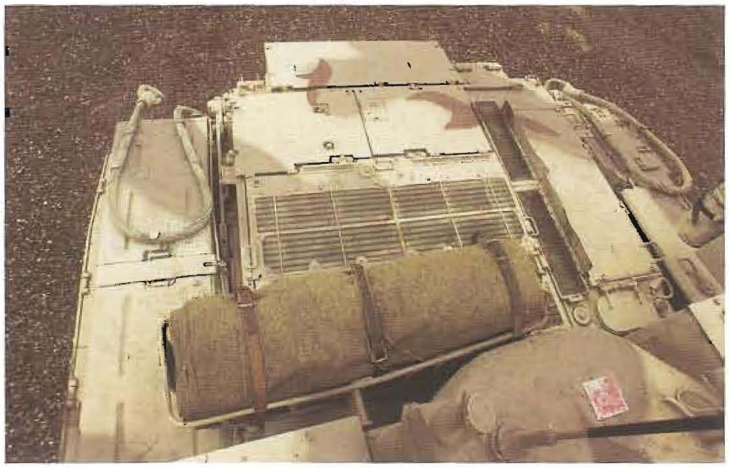
The T-72 Banan upgrade was extensively shown in the Mid-east in hopes of generating sales in the region for rebuild kits. This is a view of the T-72 Banan in the United Arab Emirates in a suitable desert camouflage.



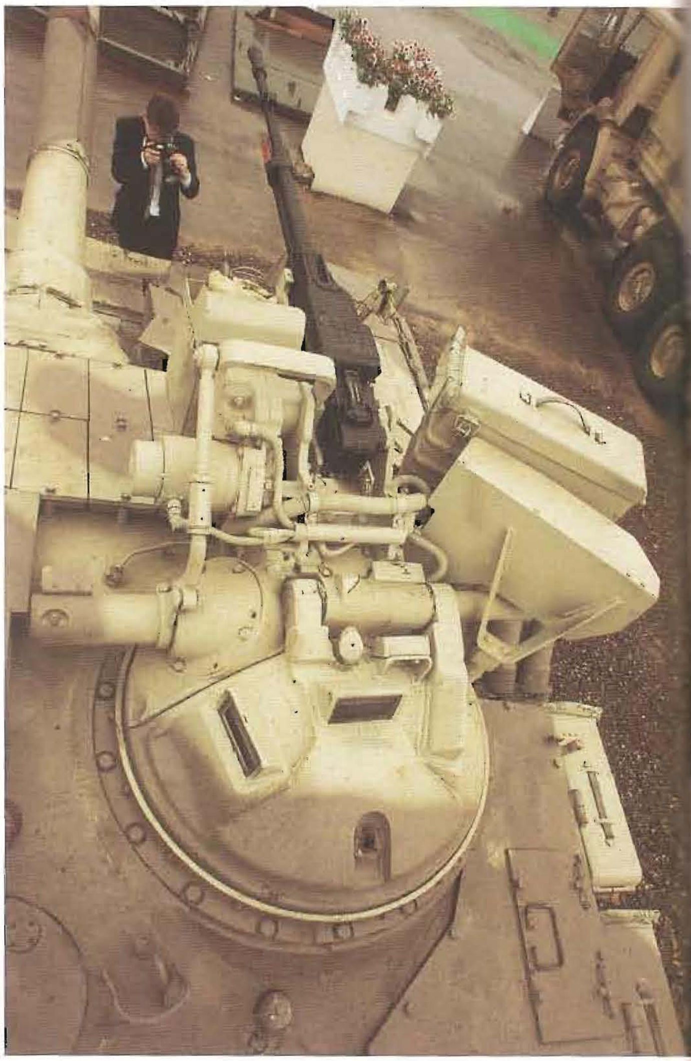
Ukraine also developed a more extensive upgrade package for the T-72, called the T-72AG, which was first revealed in 1997. Like the T-72 Banan, it uses a 6TD engine. However, it has many high cost upgrades as well including the more advanced Kontakt-5 reactive armor, new fire controls, and other improvements.



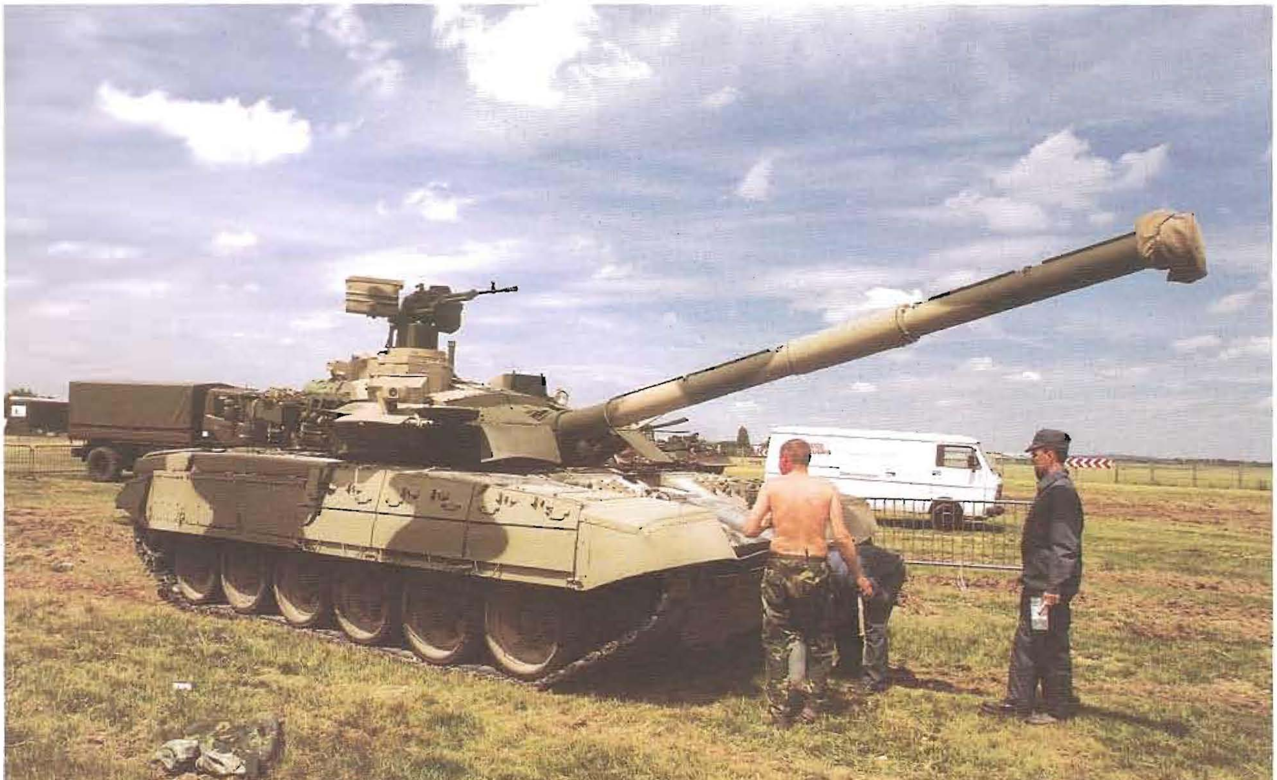
One of the changes on the T-72AG is the addition of two armored stowage boxes on the turret rear. In addition, the T-72AG uses a cupola with a remote control machine gun, similar to that on the T-80U.



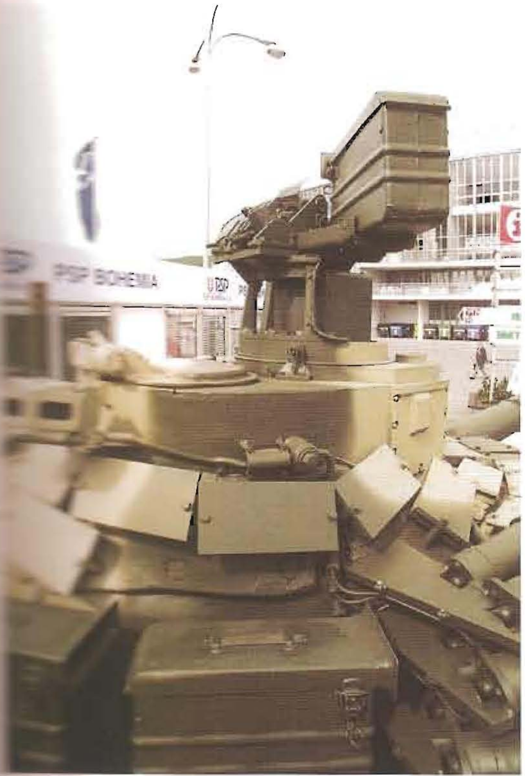
The use of the 6TD engine in the Ukrainian conversions has led to a modified engine deck, seen here on a T-72AG.



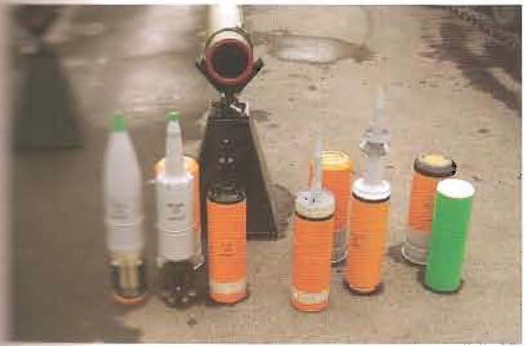
This is a close-up of the remote control machine gun cupola over
commander's station on the T-72AG.



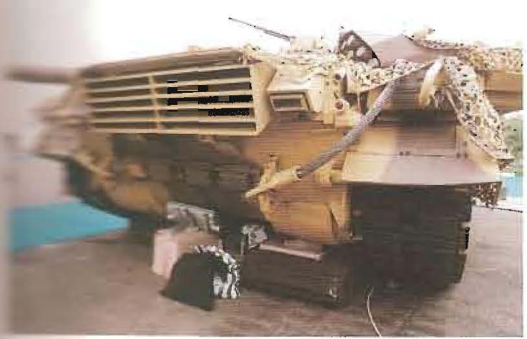
The T-72AG led
a third Ukraini
upgrade effort, the
72MP. This was a
national affair aimed
fulfilling a Czech Ar
upgrade requireme
Funded in part by
Czech firm PSP,
new version uses
control systems fro
the French fi
SAGEM. The T-72
can be distinguish
from the T-72AG by



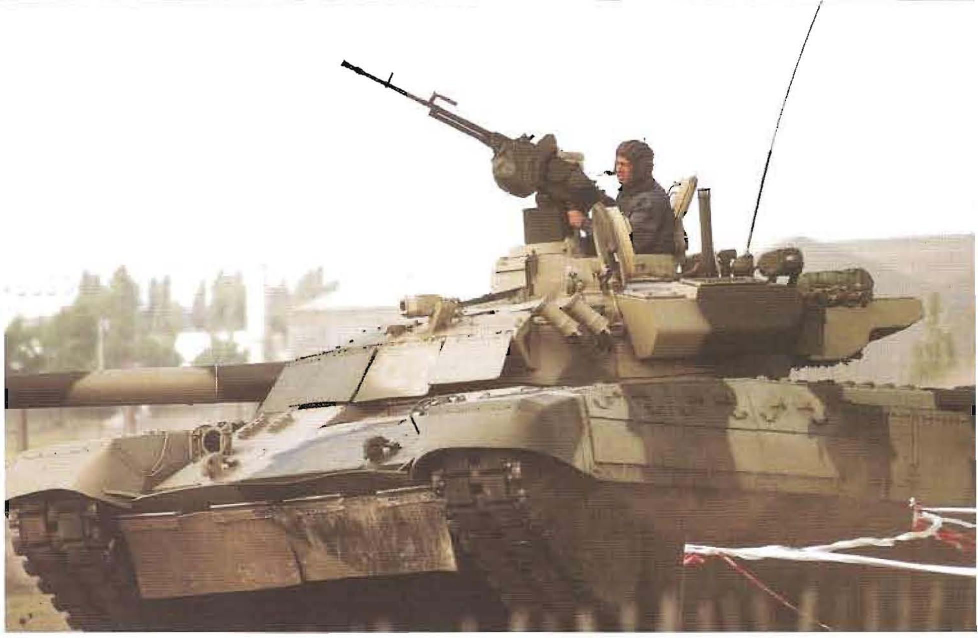
The elevated commander's cupola has been incorporated on the T-72MP to permit the use of a large SAGEM VS/MVS 580 2 axis stabilized panoramic sight. To the lower left is the laser warning receiver, incorporated as part of a self-defense package.



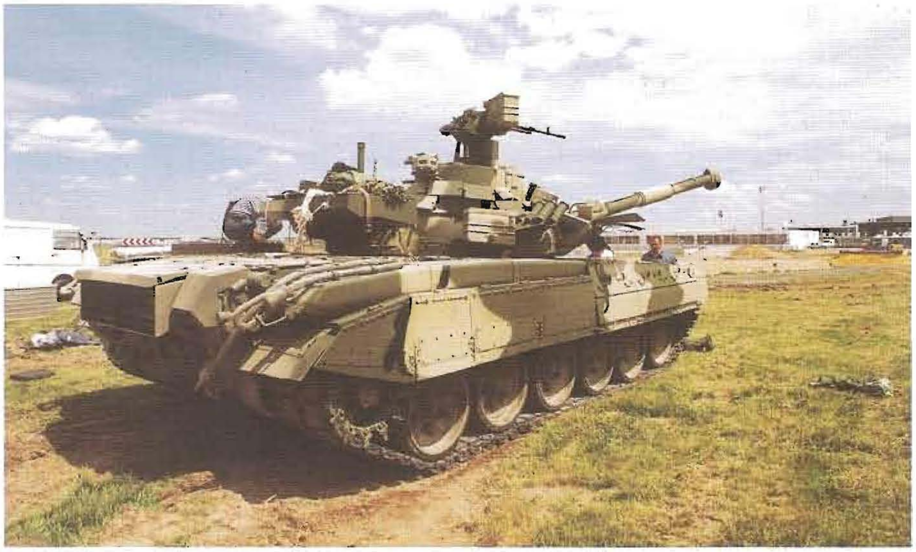
The ultimate determinant of tank combat is ammunition. Ukraine manufactures a full range of ammunition based on Soviet designs. The rounds on the left are a high explosive and shaped charge anti-tank round, while to the right are two APFSDS rounds, including the new BM44U1 projectile evident from its longer penetrator. To the extreme right is the propellant charge.



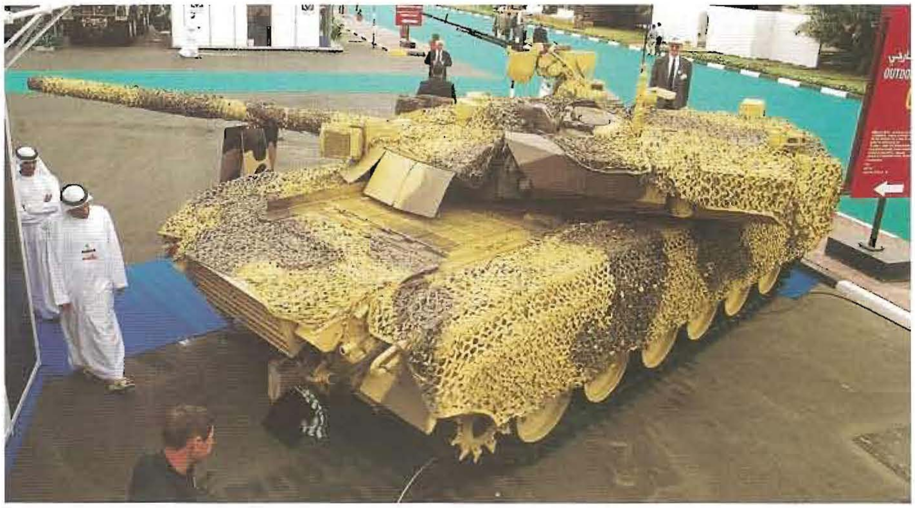
As in the case of the earlier Ukrainian T-72 versions, the T-72-120 uses a 6TD opposing piston diesel as is evident by the characteristic layout of the rear engine compartment.



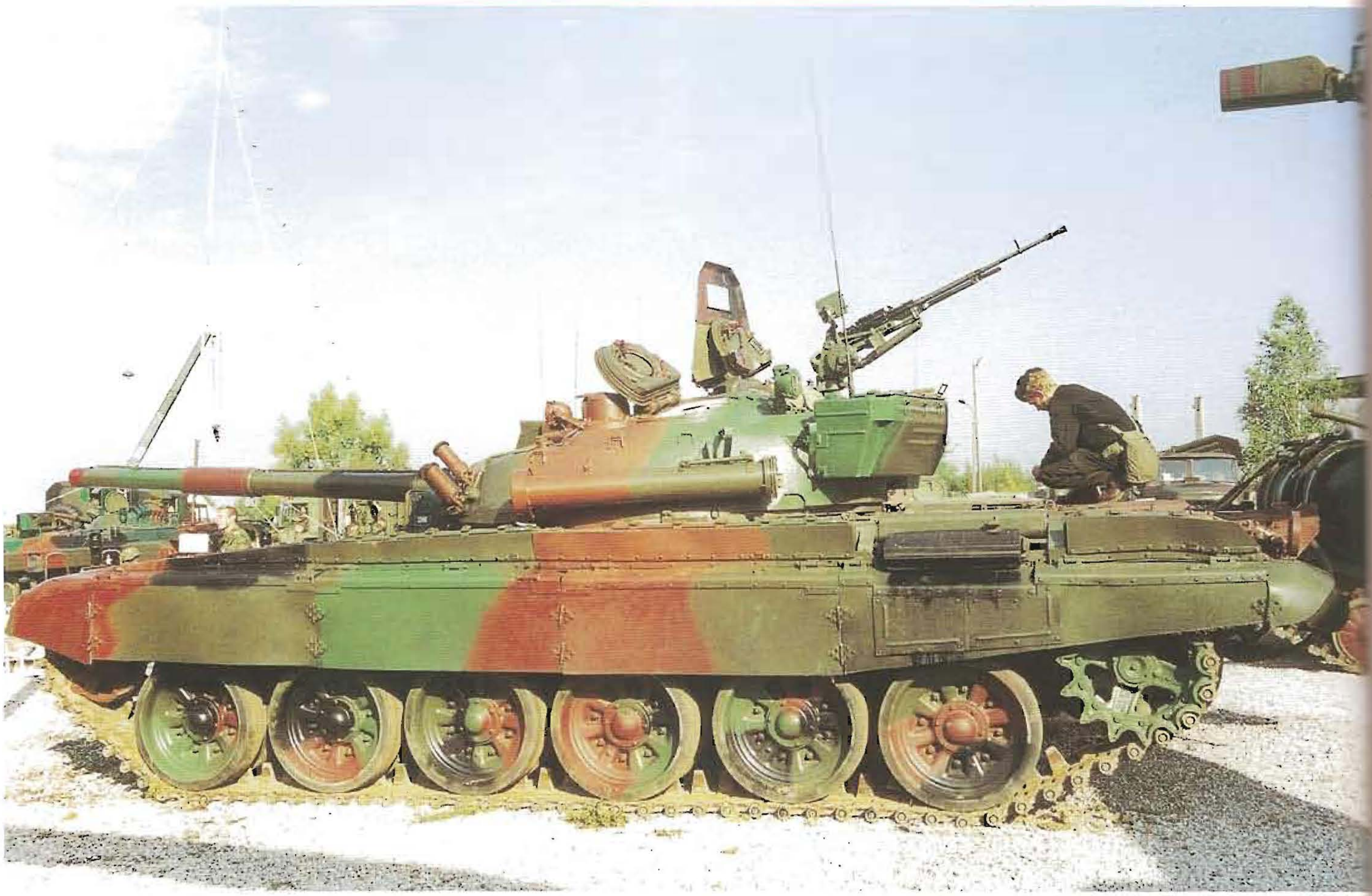
A T-72MP during trials shows the elevated commander's cupola, and the modified rear turret stowage, taken from the Ukrainian T-84 tank. Note also that this vehicle has a new rubber padded track, a requirement in many countries.



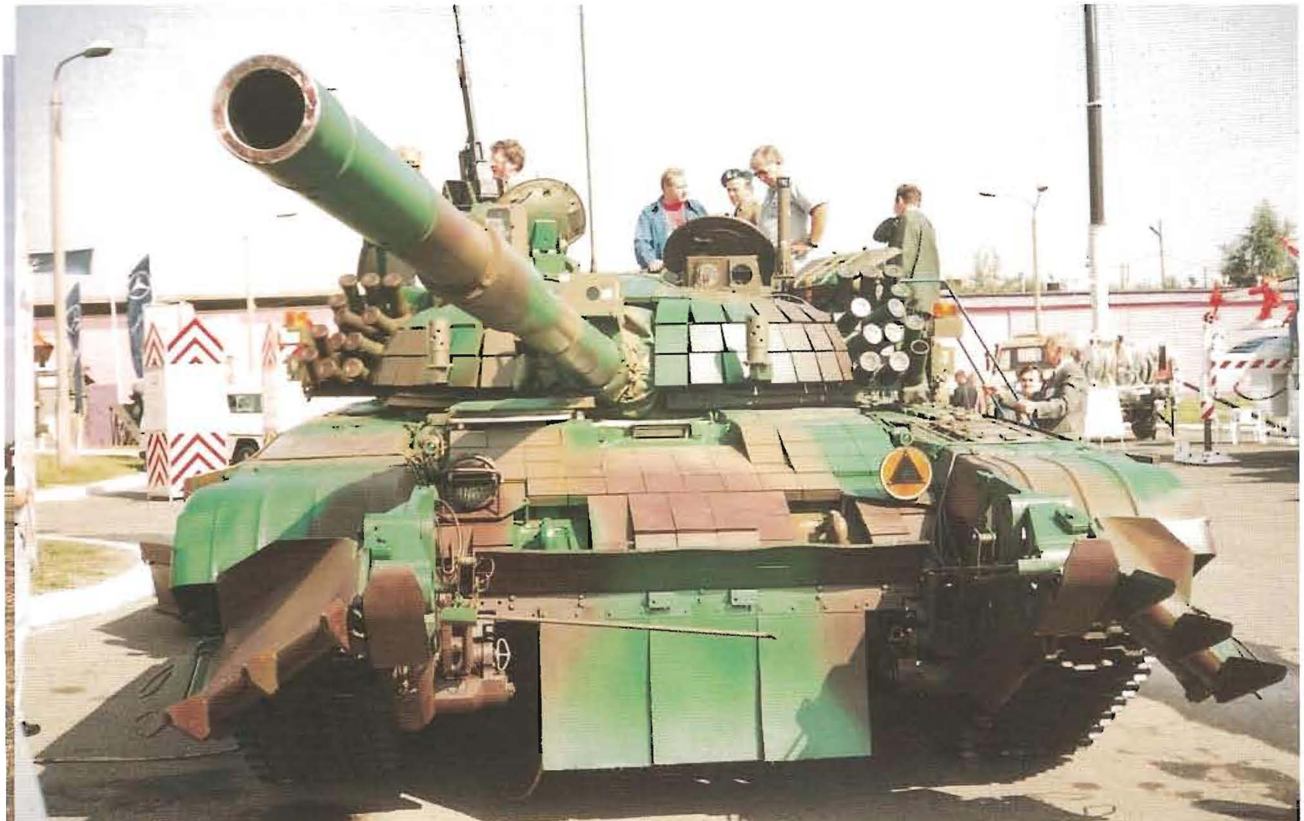
The T-72MP shares the upgraded power-plant package of the earlier T-72 Banan and T-72AG as is evident in this rear view.



With a number of T-72 users such as Poland, the Czech Republic and Hungary joining NATO, the Ukrainian Malyshev Kharkiv plant realized that a NATO compatible 120mm gun would be a better alternative to the Soviet 125mm gun. The resulting T-72-120 tank, shown for the first time in the United Arab Emirate in 1999, is the ultimate T-72 upgrade. Since the 120mm gun uses one-piece ammunition, a new bustle auto-loader, similar to that on the Leclerc tank, was incorporated, extending the tank turret back. For security reasons, many of the details of the tank were hidden under camouflage netting.



One of the largest T-72 producers outside of the former Soviet Union is Poland which builds the tank at its plant in Labedy. The last production vers
of the T-72 before the end of communist rule was the T-72M1, equivalent to the Russian T-72A. This tank is in one of the paint schemes adopted in the 19
with a pattern of red-brown and medium green over the usual olive green finish. (Wojciech Luczak)



Poland's Buma
Labedy plant began
modernization effort
the T-72 called the P
91 Twardy, for Pol
Tank-1991 "Tough".
uses the loca
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The bright green finis
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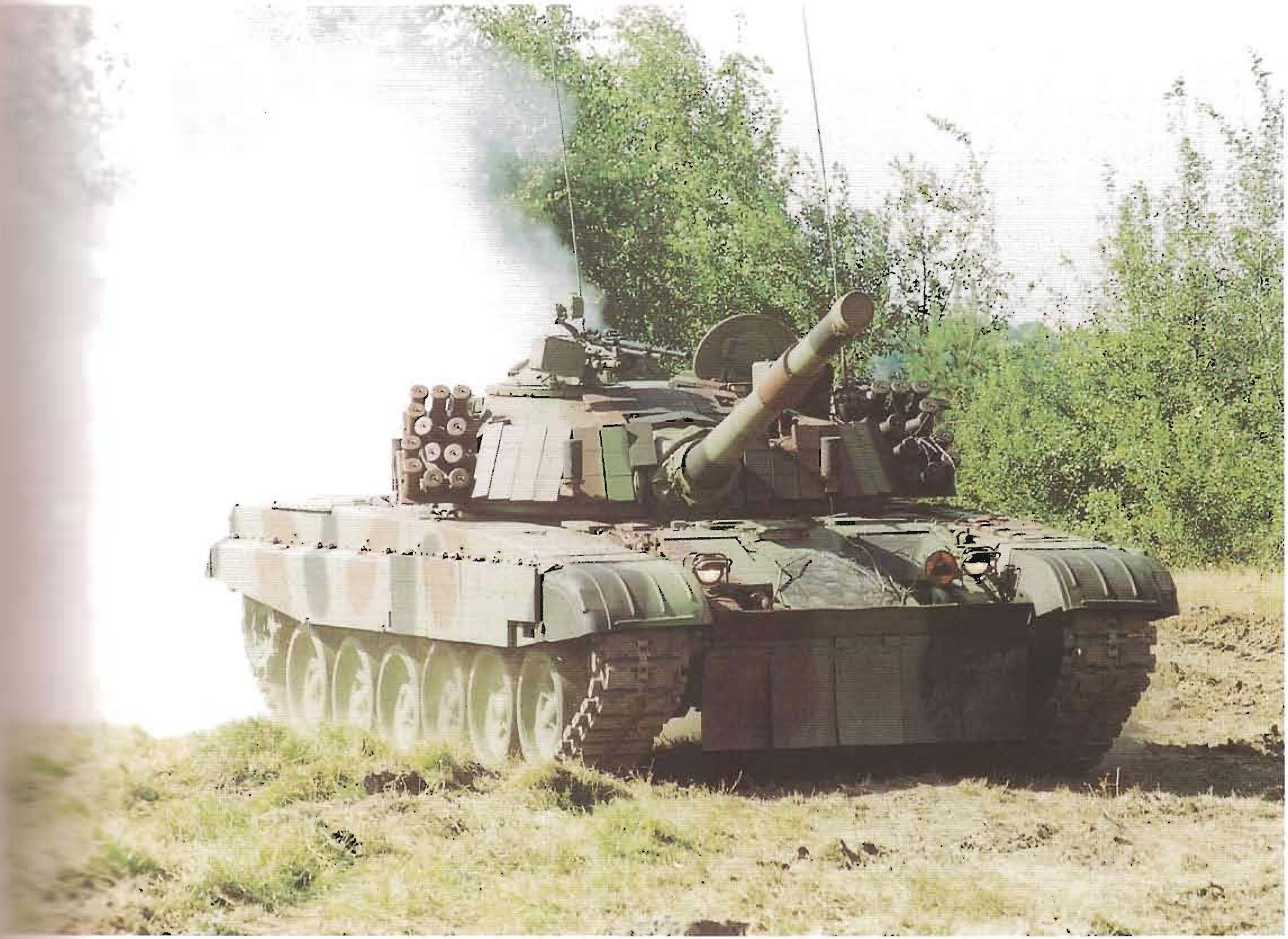
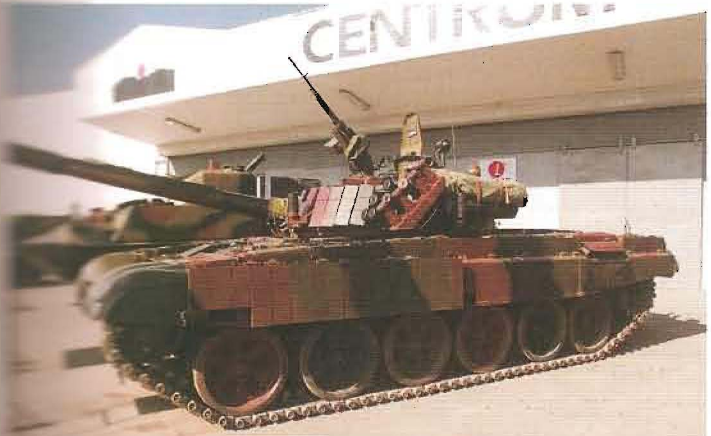
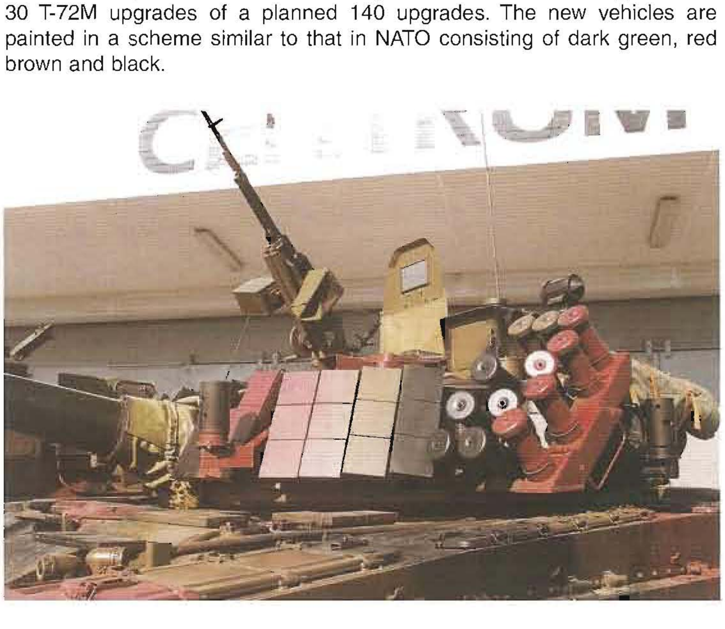


The Polish Army placed its first order for the PT-91 in 1994 for trials and a total of 58 were manufactured, 20 in 1995, and 38 in 1996. The first twenty PT-91 tanks were issued to the 34th Armored Cavalry Brigade in Zagan and took part in the 1995 war games in the Slask Military District as seen here. (G. Holdanowicz via W. Luczak)

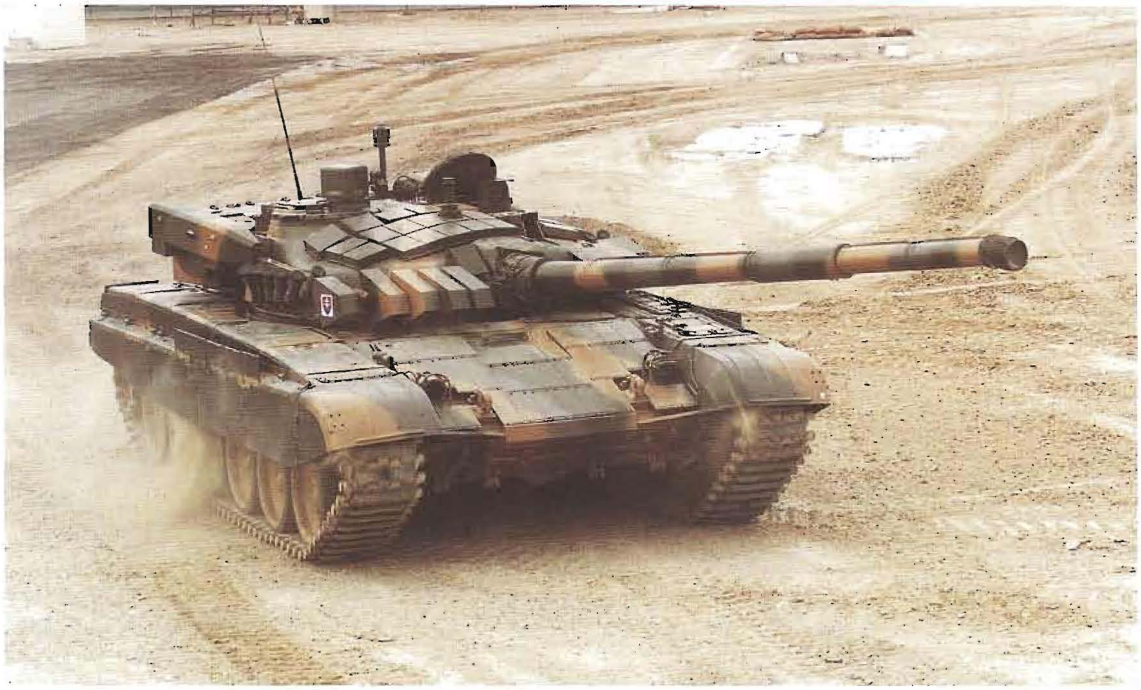


Due to a lack of funds for new tanks, in 1998 the Polish Army began a T-72M upgrade program called the T-72M1Z, with many of the PT-91 features incorporated into the new design. The 1999 defense budget funded 30 T-72M upgrades of a planned 140 upgrades. The new vehicles are painted in a scheme similar to that in NATO consisting of dark green, red brown and black.

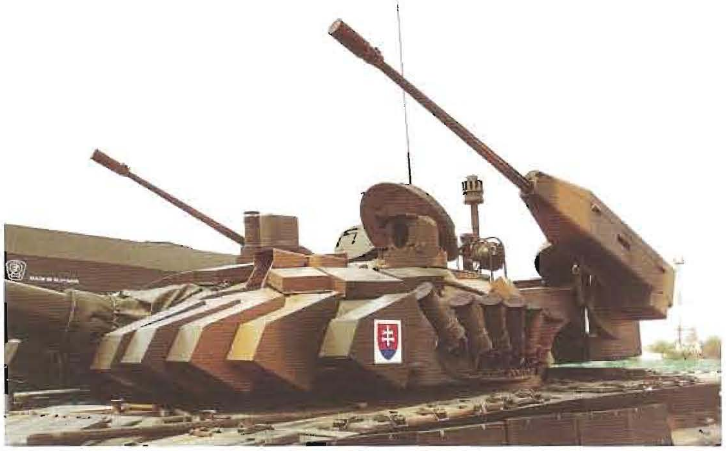


This is a close-up of the smoke mortars on the T-72M1Z. This array is a critical ingredient of a vehicle self-defense system which includes a set of laser detectors seen on either side of the array which warns the crew when the tank is targeted by a laser rangefinder or designator.

The Slovak T-72M2 Moderna

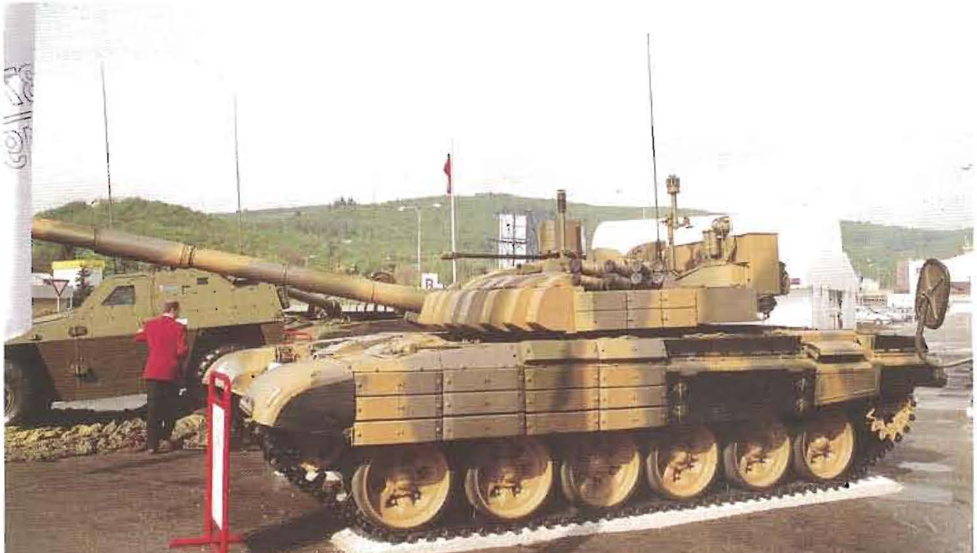


When Czechoslovakia w split into the Czech Repu and Slovakia in 1993, Martin tank plant remained Slovakia. The Martin pl developed one of the m unusual T-72 derivatives, f called Antares, and later 72M2 Moderna. It is fitted w the Dyna explosive react armor array.

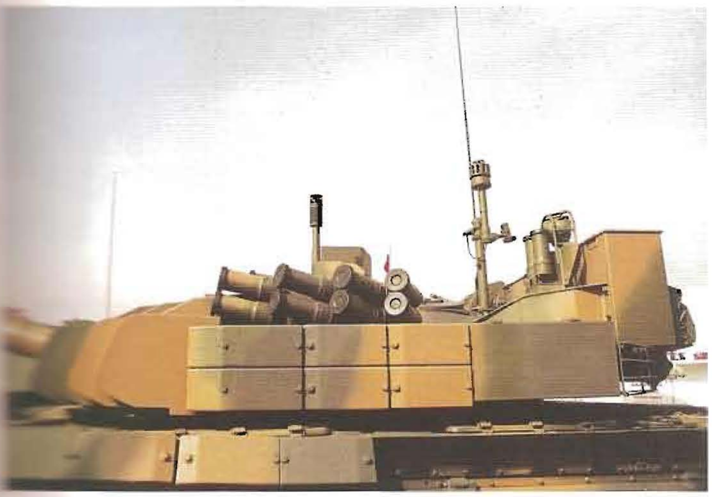


One of the more unusual features on the T-72M2 Moderna is the pair of twin 20mm KAA-001 cannon. These are intended for air defense against helicopters. Also evident in this close-up are the new gunner's and commander's sights from SABCA in Belgium.

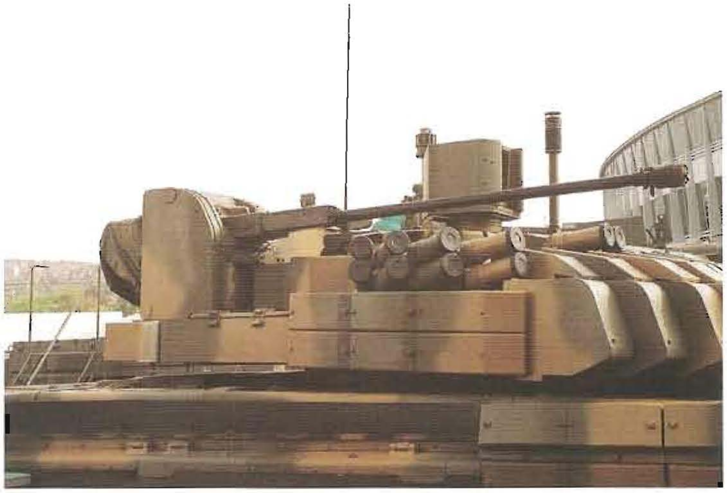
The T-72M2 is a peppy performer, as shown during this display in A Dhabi in 1995. This view shows the entrenching plow fitted under the bow the tank.



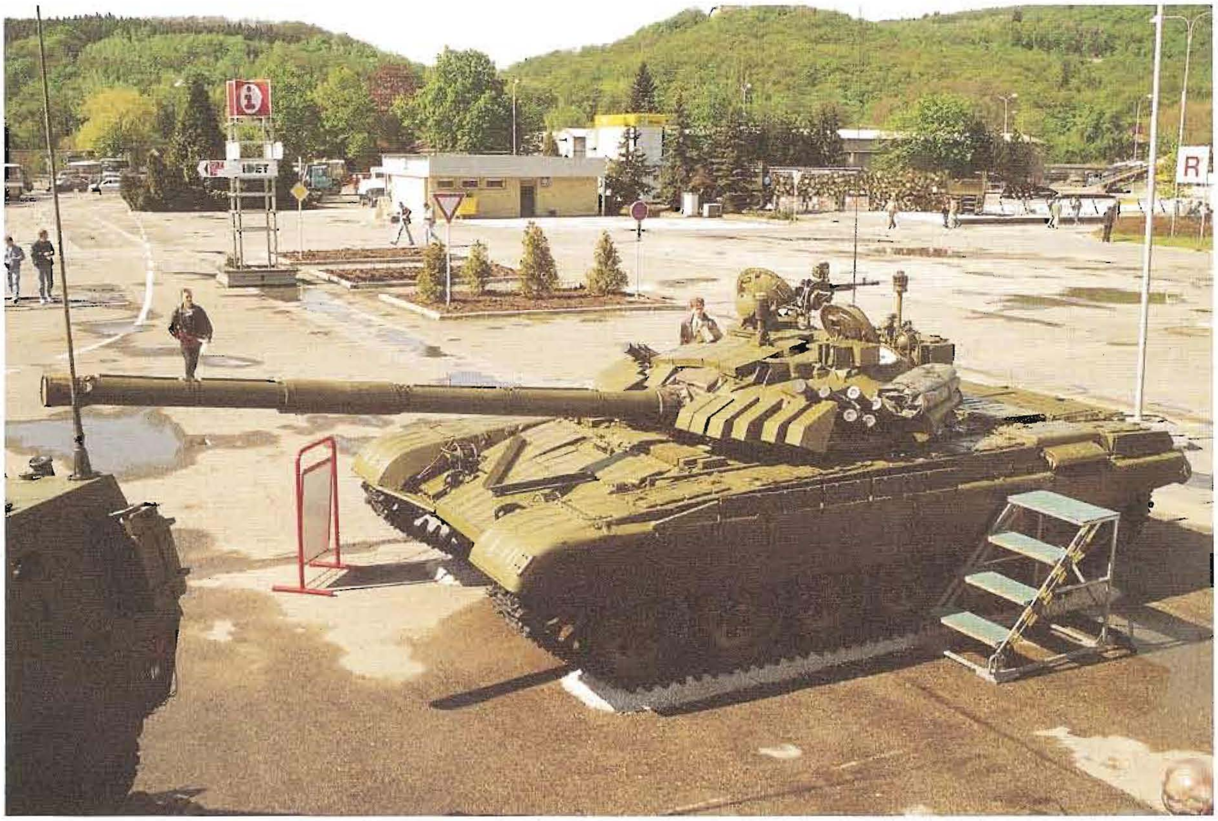
Before the T-72M2 Moderna entered serie production, it underwent a complete redesign i 1996, dropping the twin 20mm cannon for



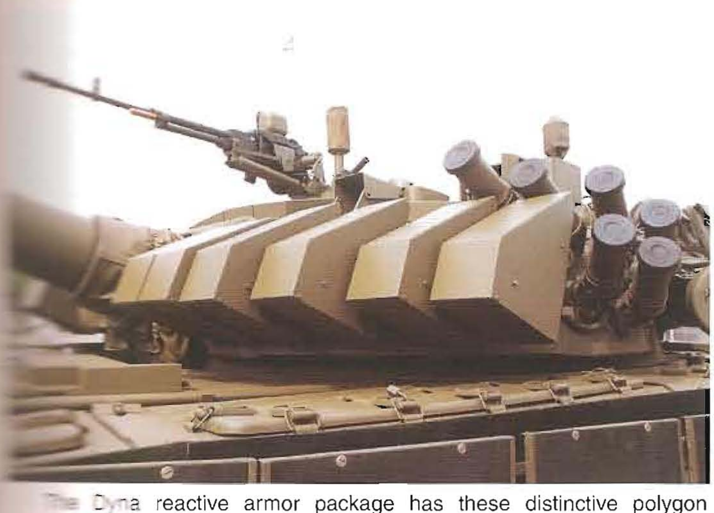
This close-up shows the reconfigured explosive reactive armor on the modernized T-72M2, as well as the Soviet-pattern Tucha smoke mortars.



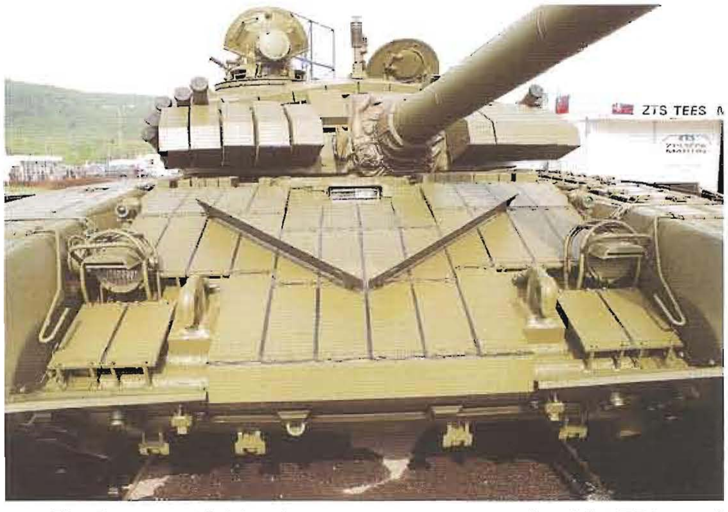
In place of the twin 20mm cannon, the revised T-72M2 has a single 2A42 30mm cannon fitted on the right side of the turret as seen here.



Due to budget shortages, many armies with the T-72 cannot afford an extensive upgrade like the T-72M2. As a result, the Martin plant also developed a low cost upgrade, the T-72M1A, which adds Dyna reactive armor and more modest fire control upgrades.

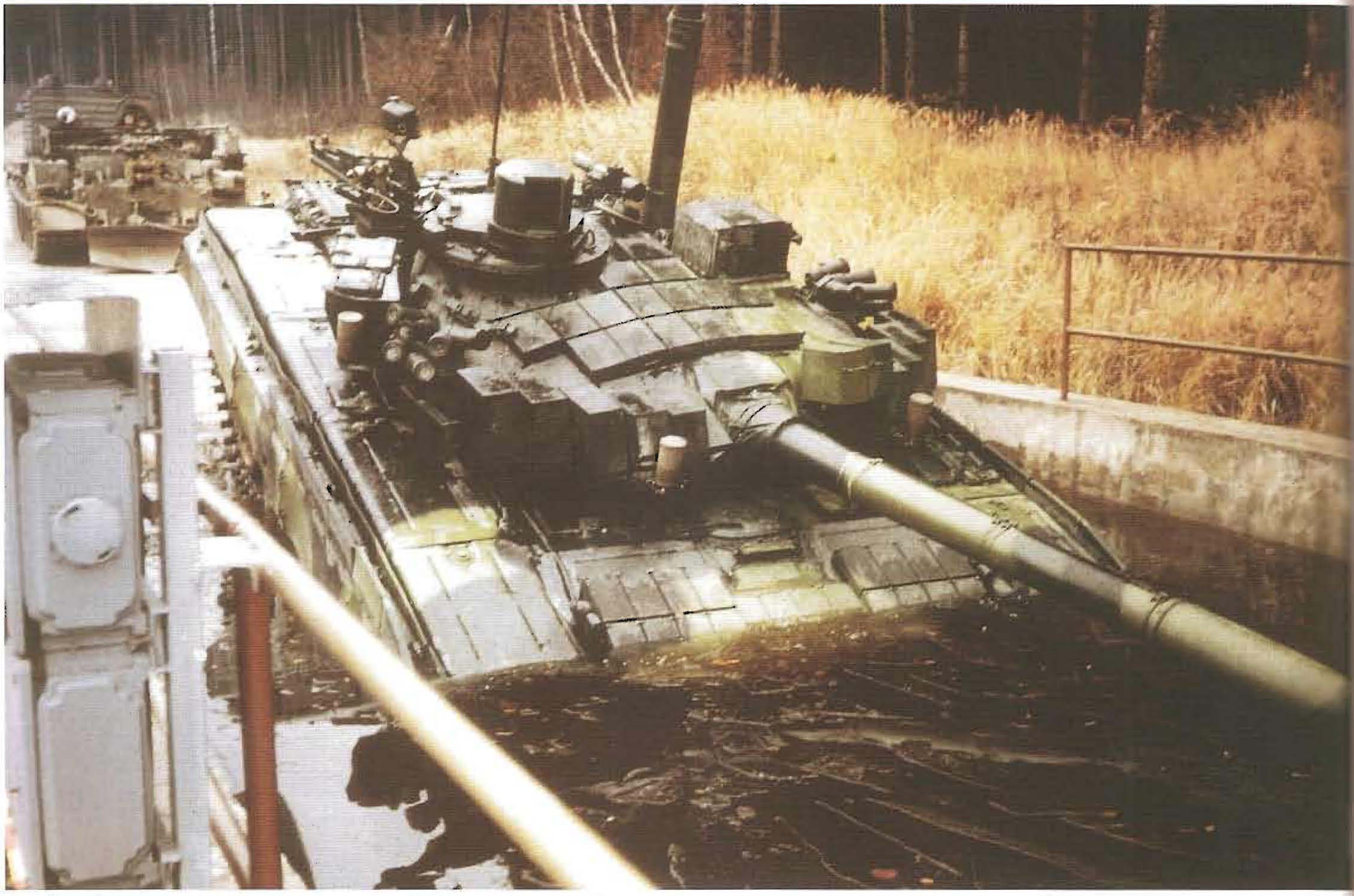


The Dyna reactive armor package has these distinctive polygon containers for their explosive panels. They are also used on some Czech T-72 upgrades.

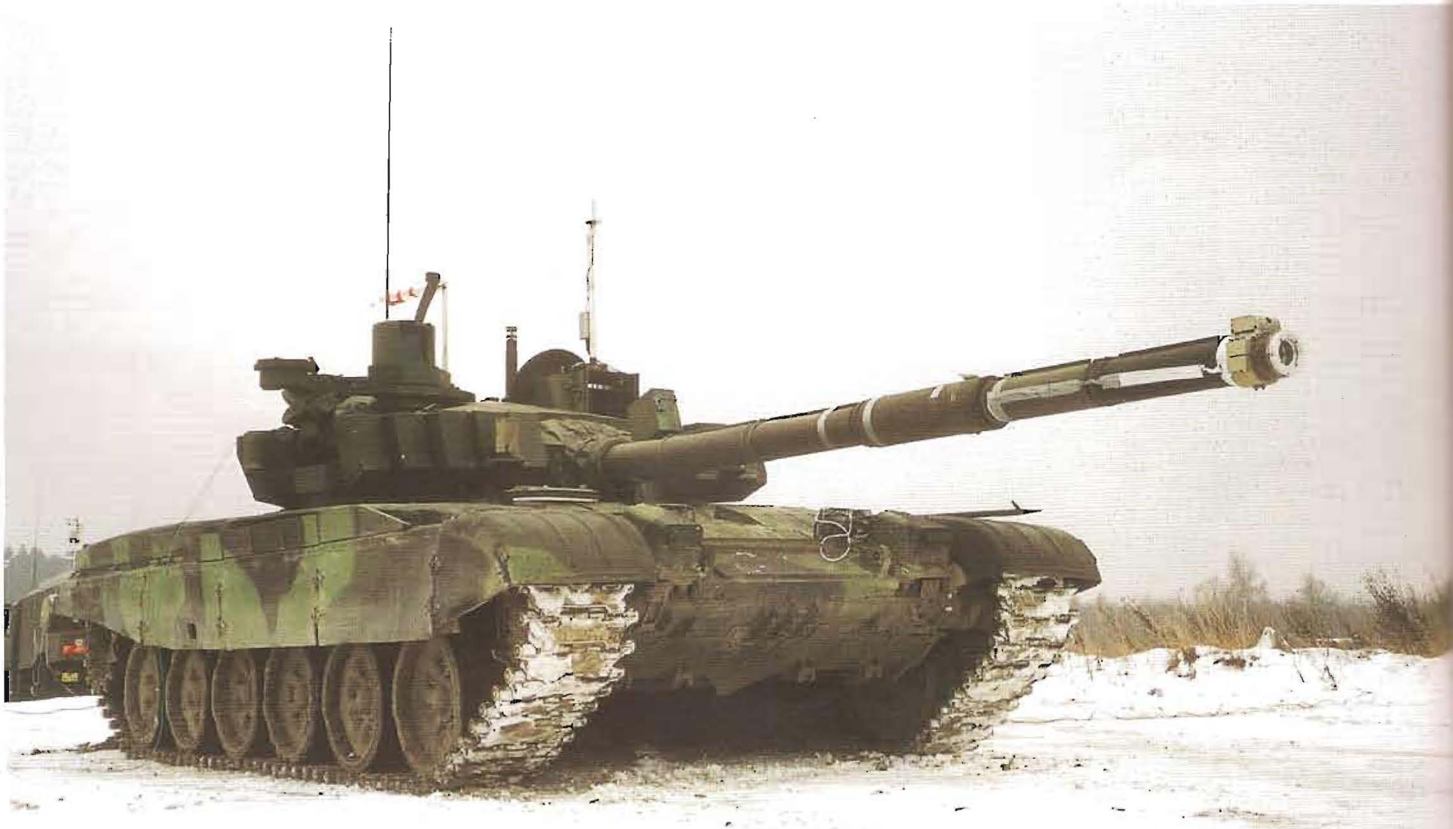


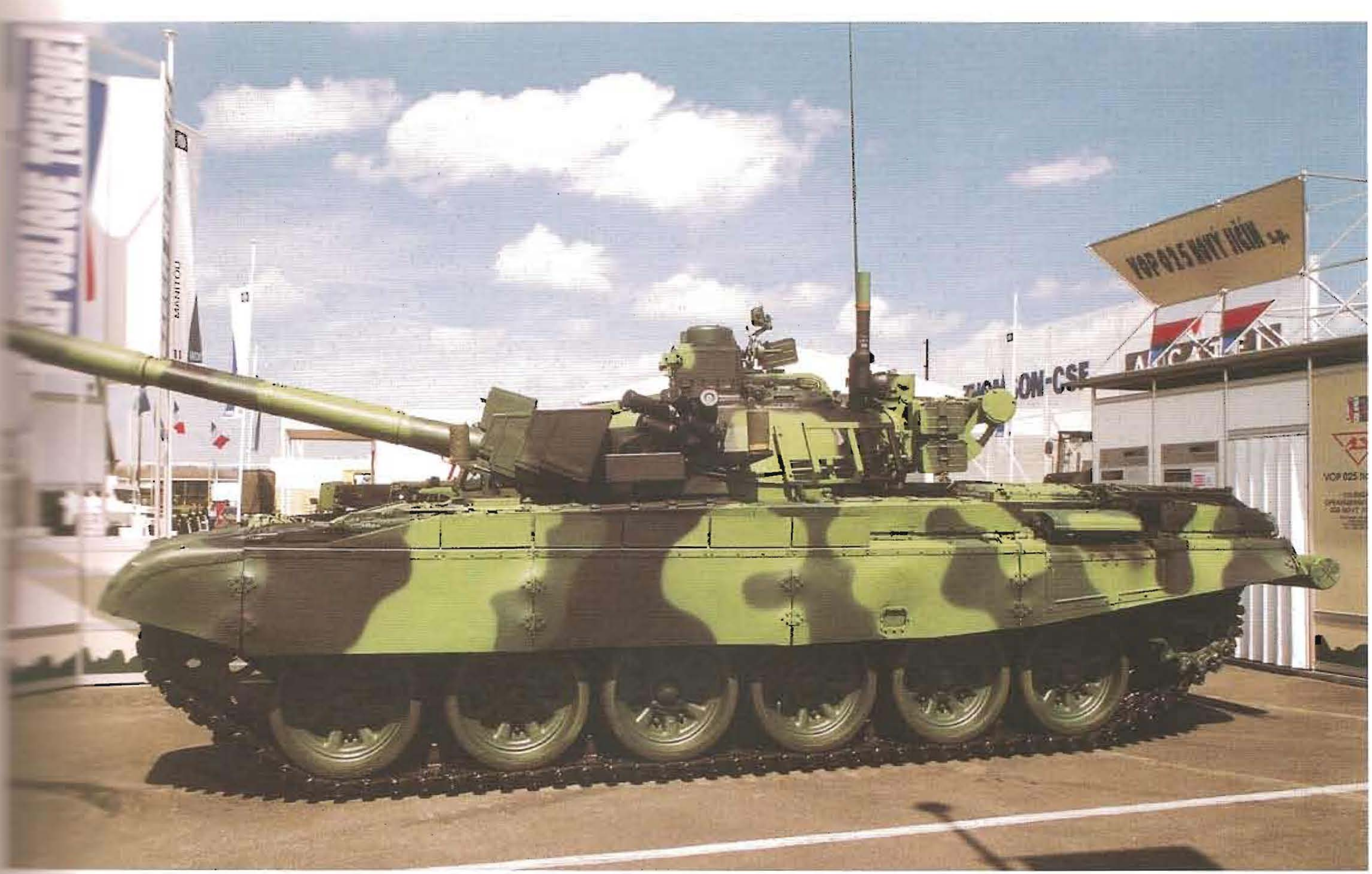
The Dyna turret bricks give way to a more conventional flat ERA panel on the hull glacis panel as seen here in this detail view.

The Czech T-72M4

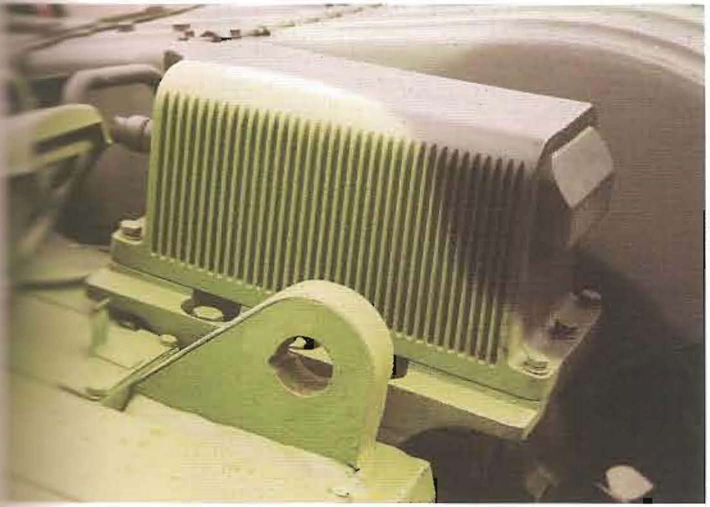


The Czech Army has been planning to rebuild a portion of its T-72M1 tanks and in 1996 selected the T-72M4 package developed by the VOP 25 fac at Novy Jicin. Among its features is a new 1,000 hp engine from the UK firm, Perkins. Here it is seen during fording trials. (Perkins)

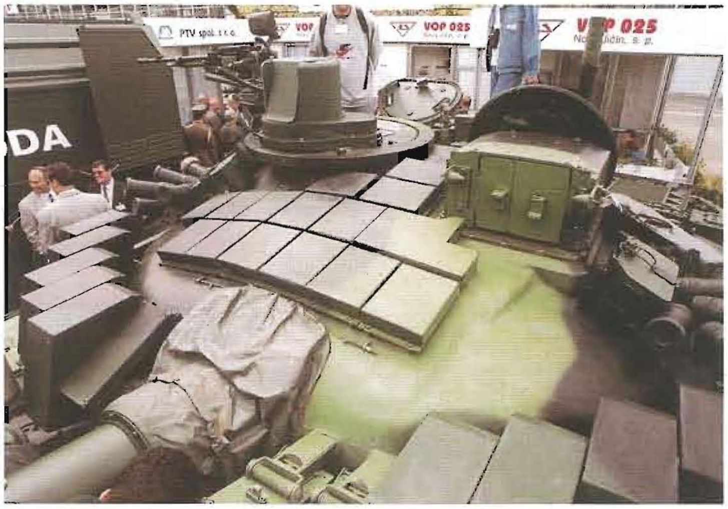




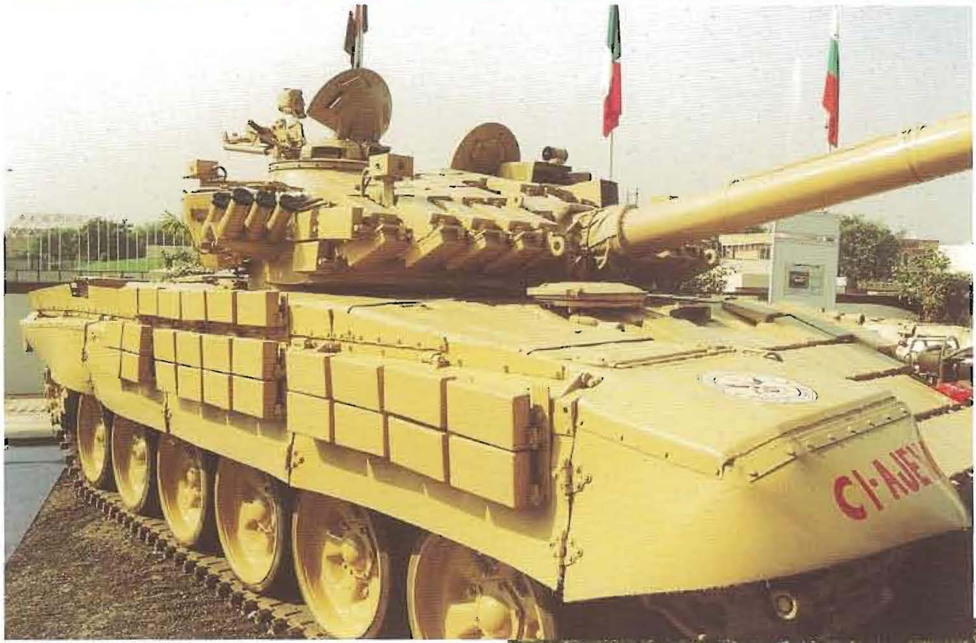
The Czech Army camouflage scheme for the T-72M4 is a pattern of light green and black over the usual olive green.



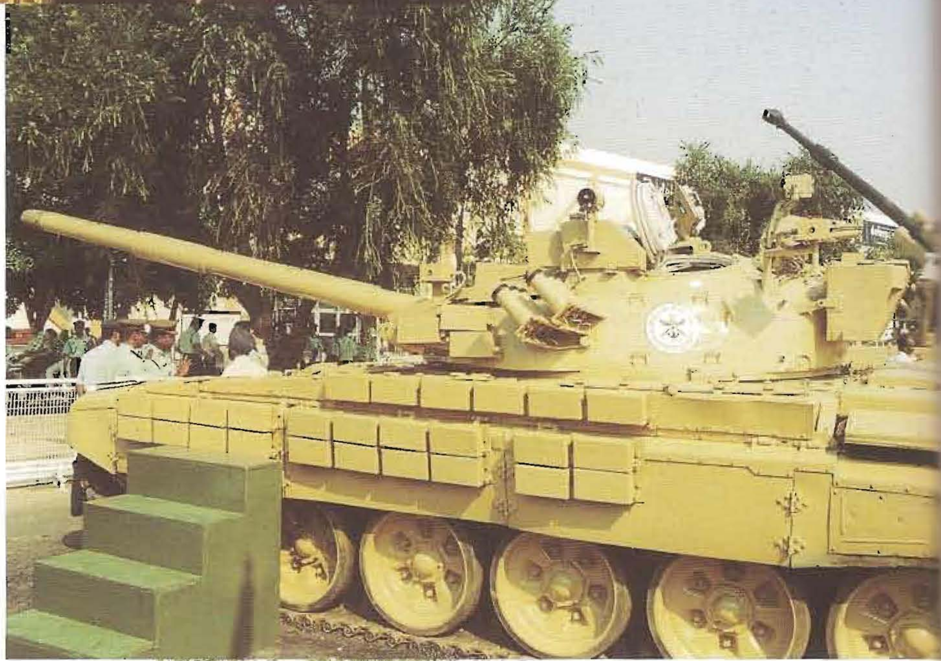
The T-72M4 uses technology from many different sources including this magnetic mine neutralization system mounted on the hull front, developed in Israel. The East German army used a similar system in the late 1980s.



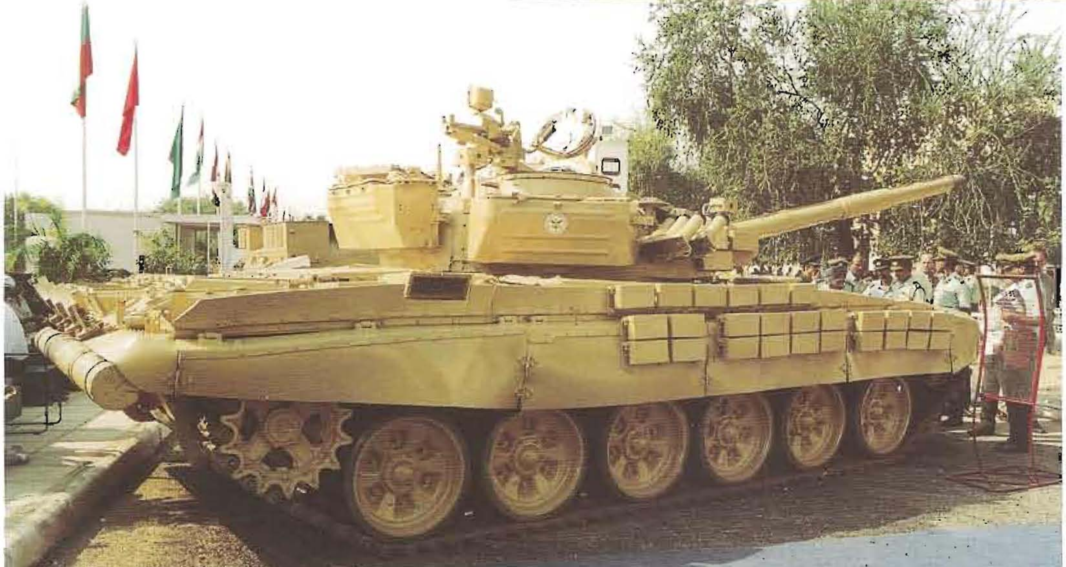
This close-up of the turret roof shows the modified explosive reactive armour developed in the Czech republic, as well as the new gunner's and commander's fire controls.



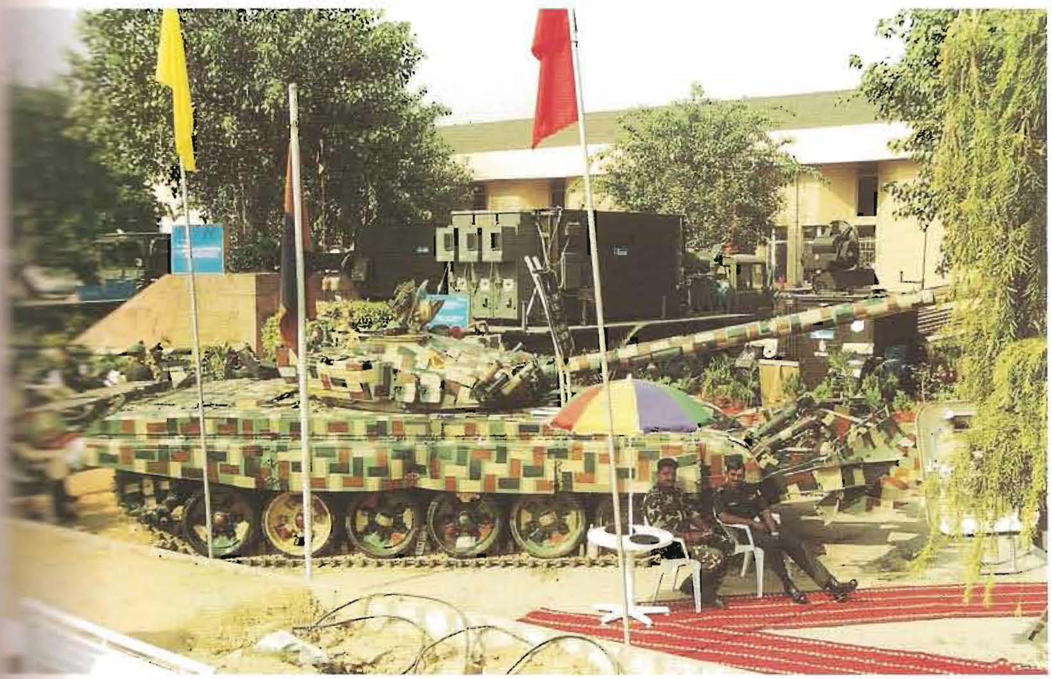
India is one of the larger manufacture
the T-72, producing it under license at a pl
Avadi. This tank is somewhat similar to th
72M1, but this current production type is
with Kontakt reactive armor, and has the
style front fender. (Wojciech Luczak)



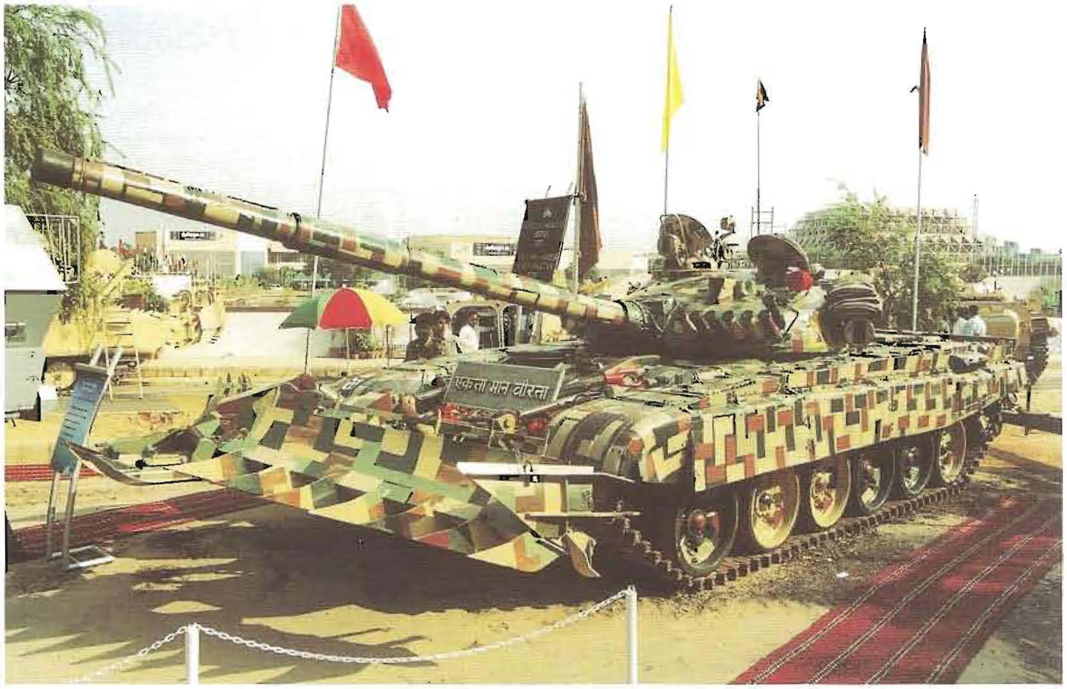
This side view of the modernized Ajeya shows some of the local modifications including a new gunner's thermal imaging sight and a new wind sensor. (Wojciech Luczak)



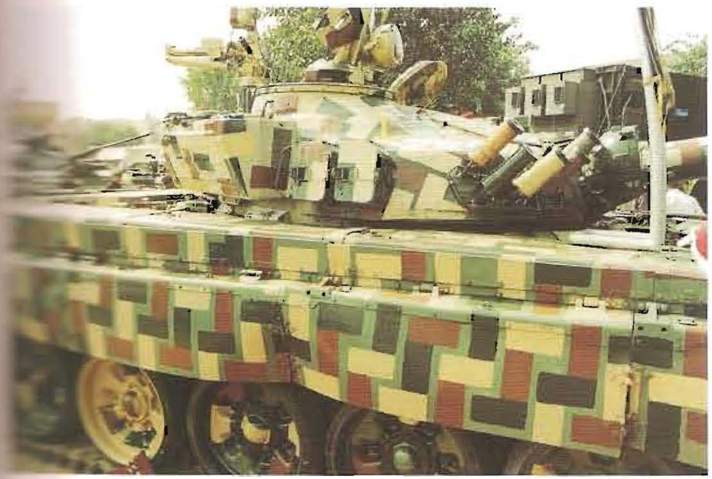
This right side shot shows one
the other changes introduced on
modernized Ajeya, the exhaust por



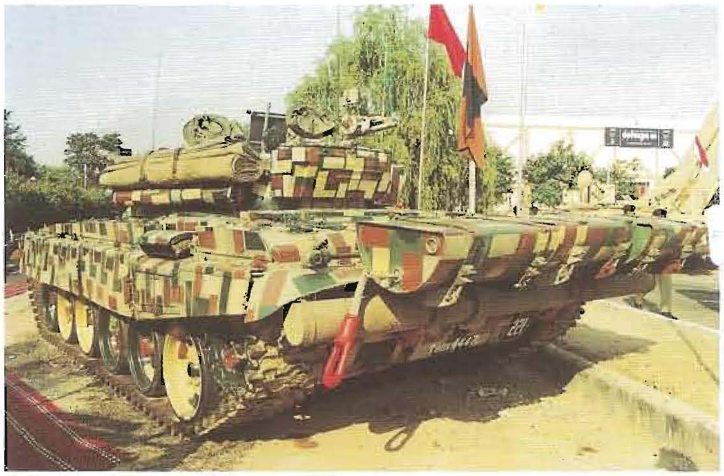
India acquired the T-72A/T-72M1 from the Soviet Union and Poland before embarking on local production. This vehicle is finished in the distinctive Indian scheme of pattern painted camouflage. (Wojciech Luczak)



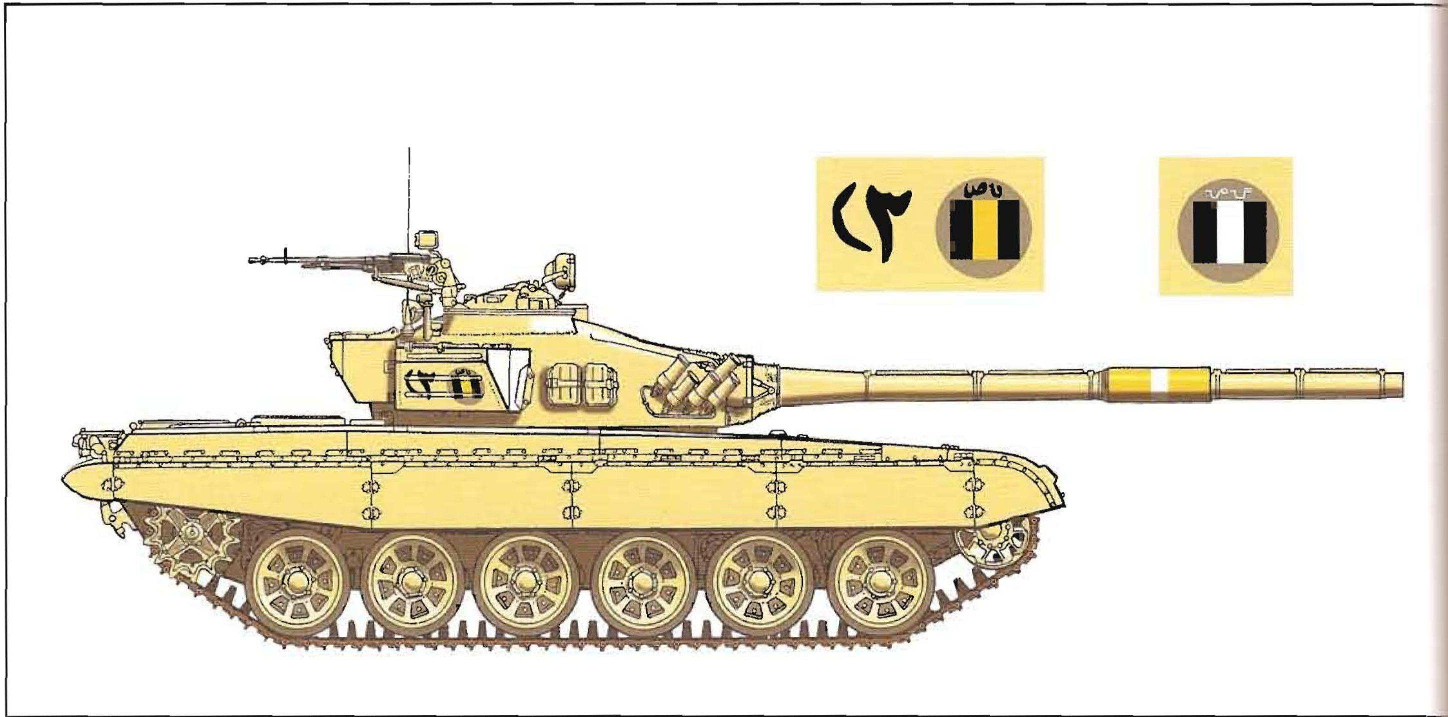
This particular T-72M1 is fitted with locally developed Indian mine rake. This particular tank serves with the 69th Armoured Regiment, which distinguished itself in the capture of [illegible] in the 1971 war with Pakistan while it was still equipped with the T-55 tank. (Wojciech Luczak)



This close-up shows distinctive camouflage used on some Indian armoured vehicles. The suspension uses the later style of road-wheel with six versus eight spokes. (Wojciech Luczak)

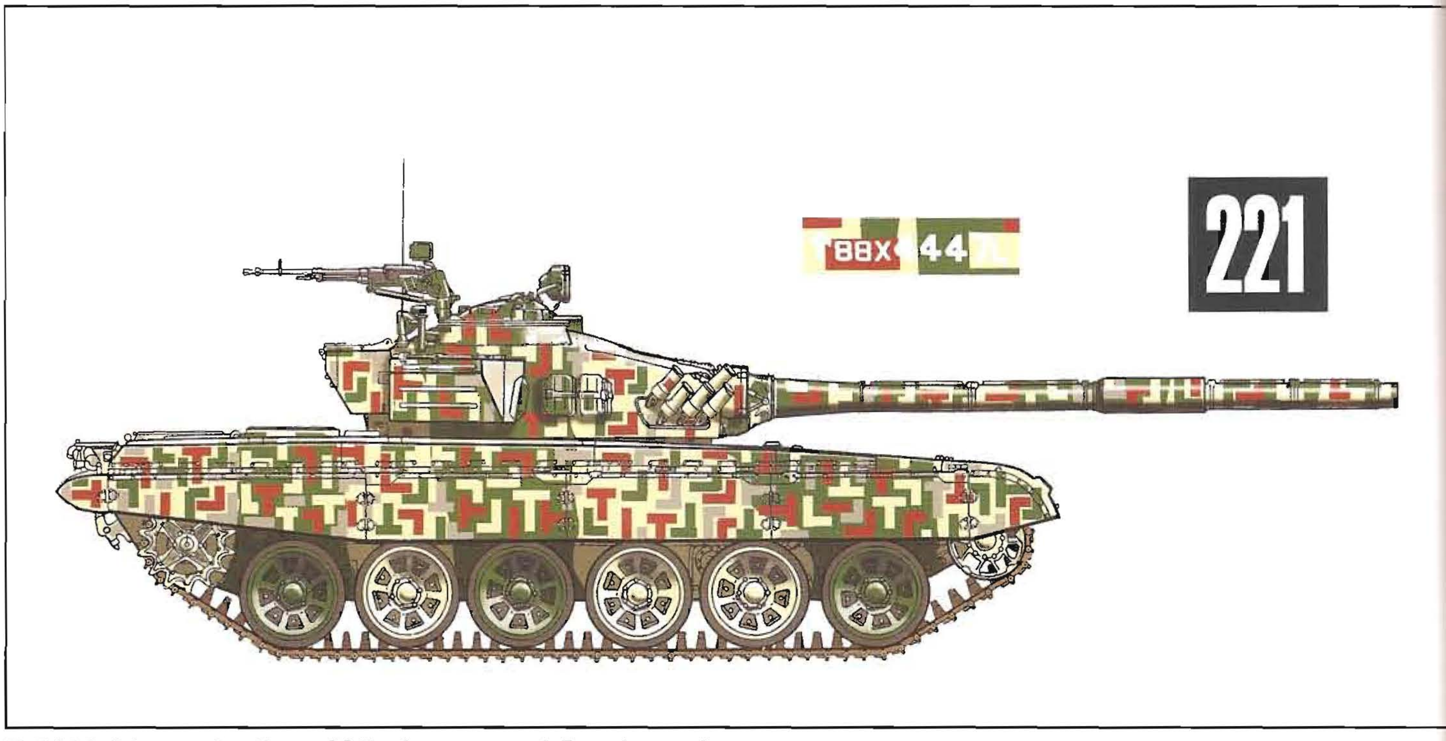


The Indians sometimes equip their T-72 tanks with half-fuel drums in the rear. This enable them to traverse the turret without the interference presented by the full size fuel drums. (Wojciech Luczak)



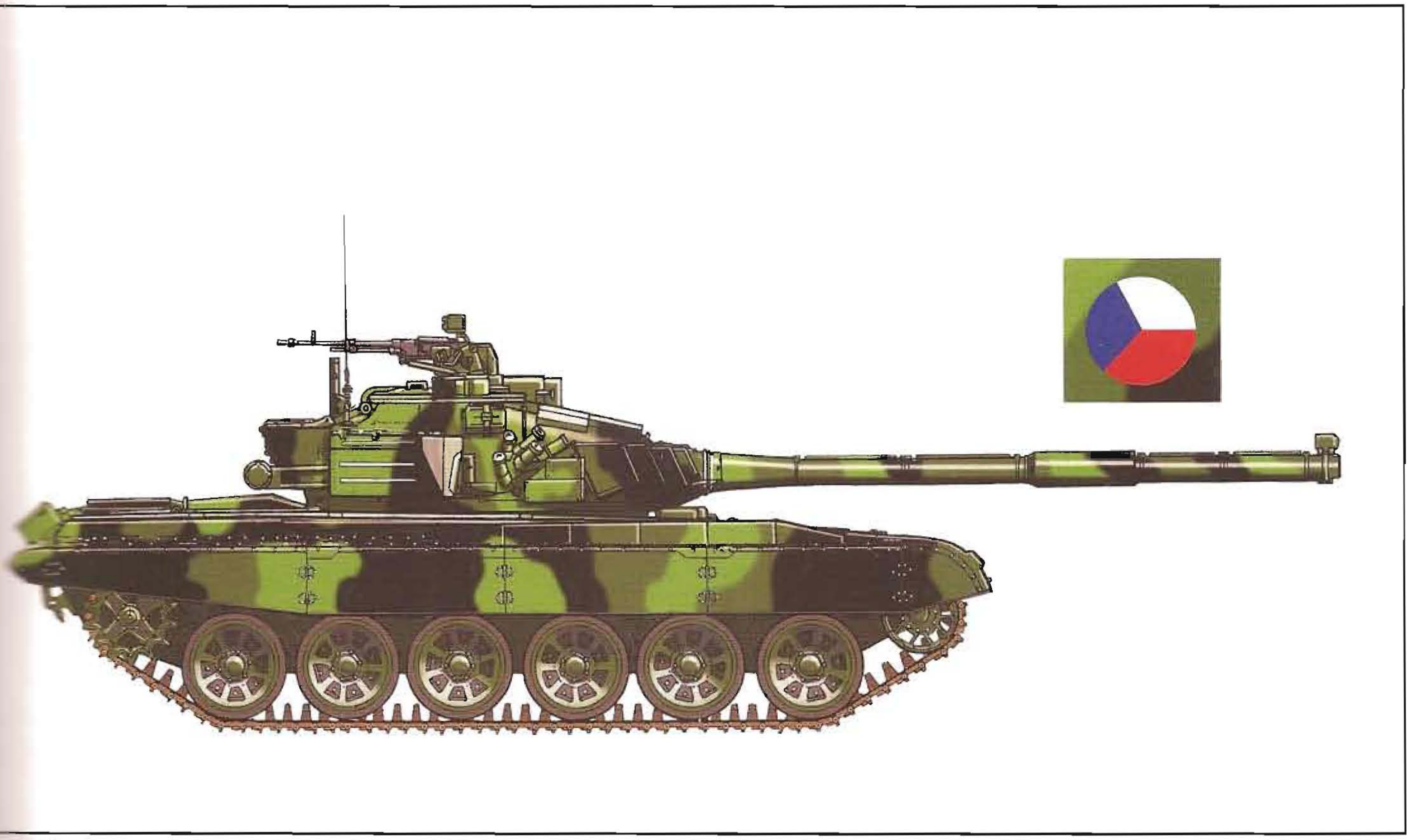
T-72M1, 3rd Regiment, 12th Armored Brigade, Iraqi 3rd Saladin Armored Division Operation Desert Storm, February 1991

Iraqi tanks were painted in various shades of sand depending on their source. Most were delivered from the Soviet Union and Poland in olive green, and locally repainted. Iraqi tanks during the Gulf War used a complicated set of markings that varied from unit to unit. The Saladin Division is fairly typical. The division was identified by painting the fume extractor on the barrel in yellow with a white stripe. Compo units had a tri-color rectangle painted on a gray circle. Black bands at either side of the rectangle identified the 12th Armored Brigade, the center band identified the regiment: gray (HQ); white (1st); black (2nd); yellow (3rd); green (mechanized battalion). The inset drawing the 3rd Regiment insignia on the left, and the 1st Regiment insignia on the right. Above the rectangle in black or white was QX in Arabic sign Qadisiyah Saddam, the battle cry during a decisive battle in 637 AD. The vehicle tactical number is painted in black Arabic numerals to the of the regimental insignia, in this case the number 23, platoon commander of the 2nd company, third platoon.



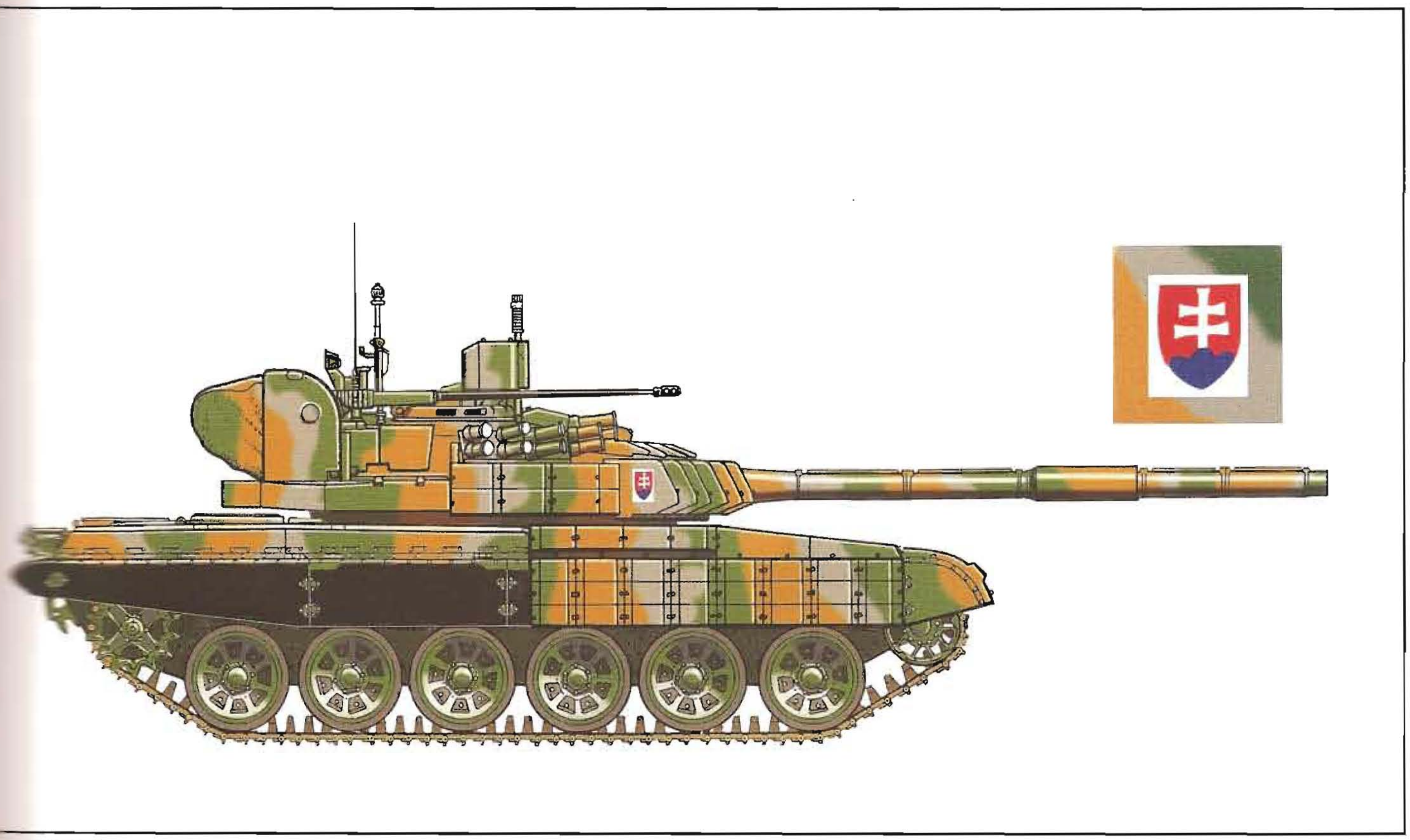
T-72M Ajeya, Indian 69th Armoured Regiment

Since the early 1990s, Indian armored vehicle have been experimenting with pointillist camouflage consisting of small geometric sha In this case, the vehicle is finished is overall dark green with bands of light sand color. On top of this are a pattern of geometric shapes pai in dark green, red brown, medium gray and ivory white. Indian markings follow British patterns. The registration number is prefaced by an upw pointing arrow followed by an alphanumeric code. This is usually painted in white, sometimes on a black rectangle, on the lower center of



T-72M4, Army of the Czech Republic, 2000

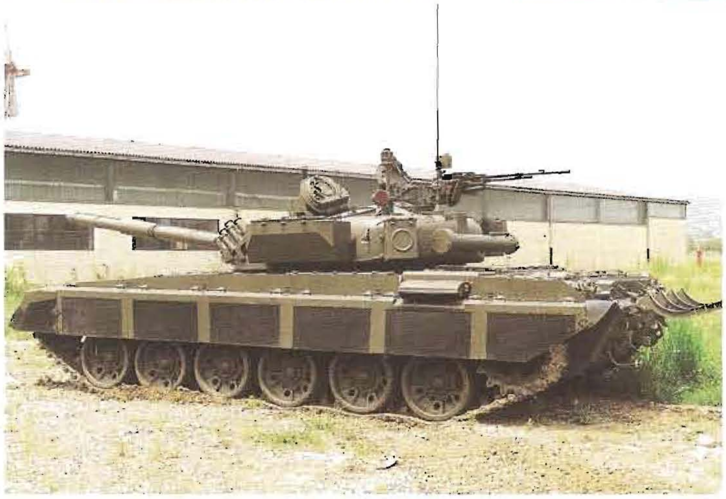
Although the Czech Army mostly follows the old Warsaw Pact pattern of colors and markings, new schemes have been appearing in recent years. This is the scheme adopted on the prototypes of the modified T-72M4 tanks and consists of rolling patterns of medium green, dark green and black. The Czech Republic has retained the tri-color roundel of former Czechoslovakia which is sometimes painted on its tanks. In this case, however, it is not carried.



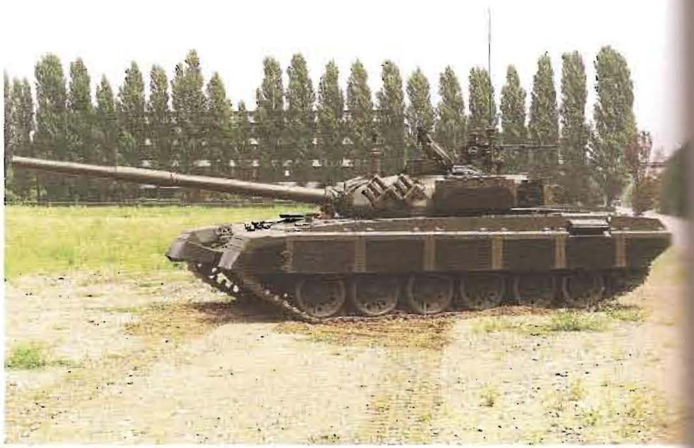
T-72M2 Moderna, Army of the Slovak Republic, 1997

As in the case of the Czech Army, the Slovak Army generally follows the old Warsaw Pact colors and markings. In recent years, new Slovak vehicles have been painted in a more elaborate camouflage pattern. This consists of a base color of olive drab, with thin bands of golden-brown and medium gray sprayed on. The vehicles now carry the Slovak national insignia in red, white and blue as shown in the inset drawing.

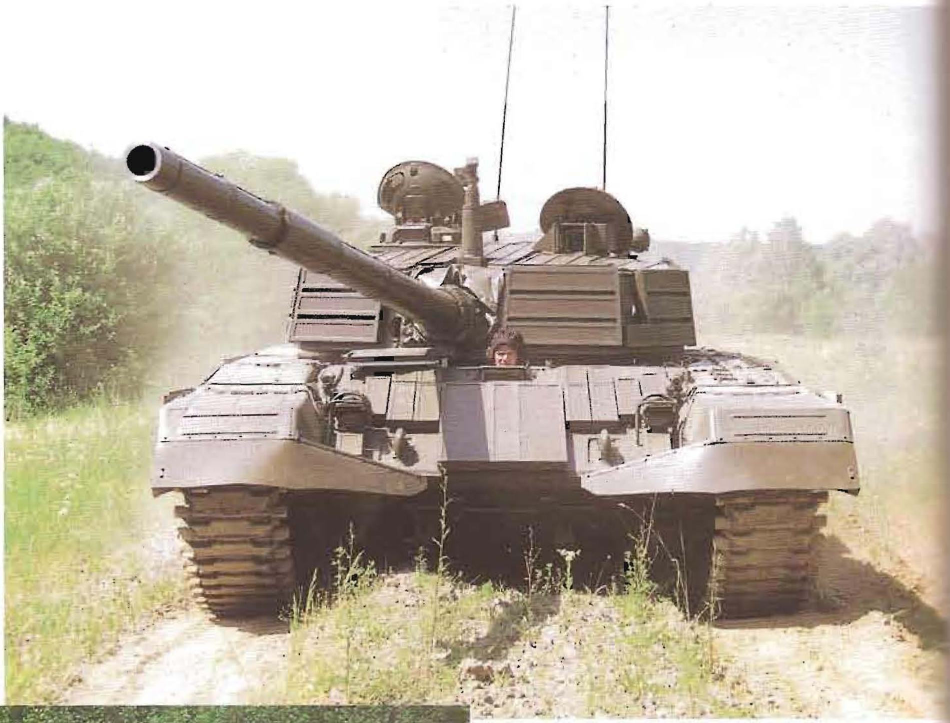
The Croatian M-95 Degman Tank



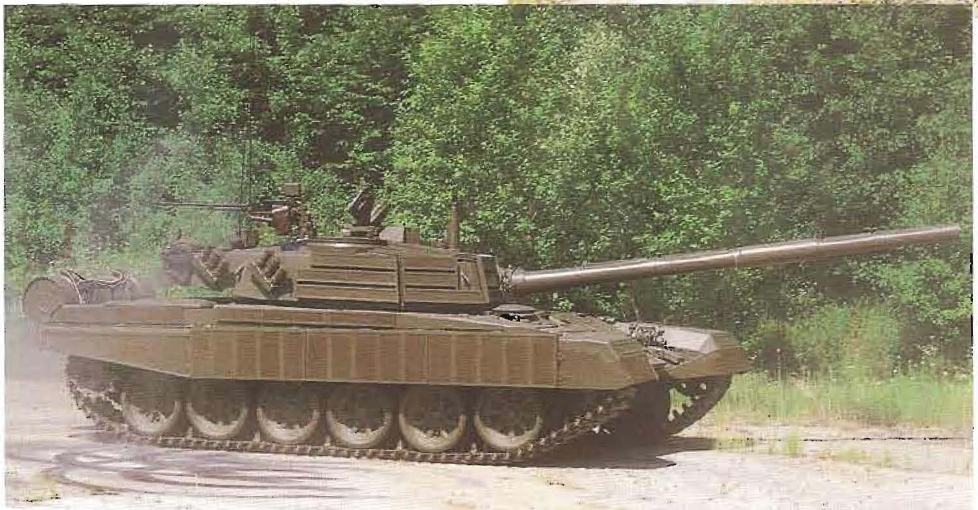
Prior to the collapse of Yugoslavia, the T-72M1 was produced locally under the name M-84A. After the Yugoslav break-up, Croatia re-established M-84 production with the M-84AB. An improved version using locally manufactured parts was developed in the late 1990s called the M-84A4 Snajper (Sniper). (Terry Gander)



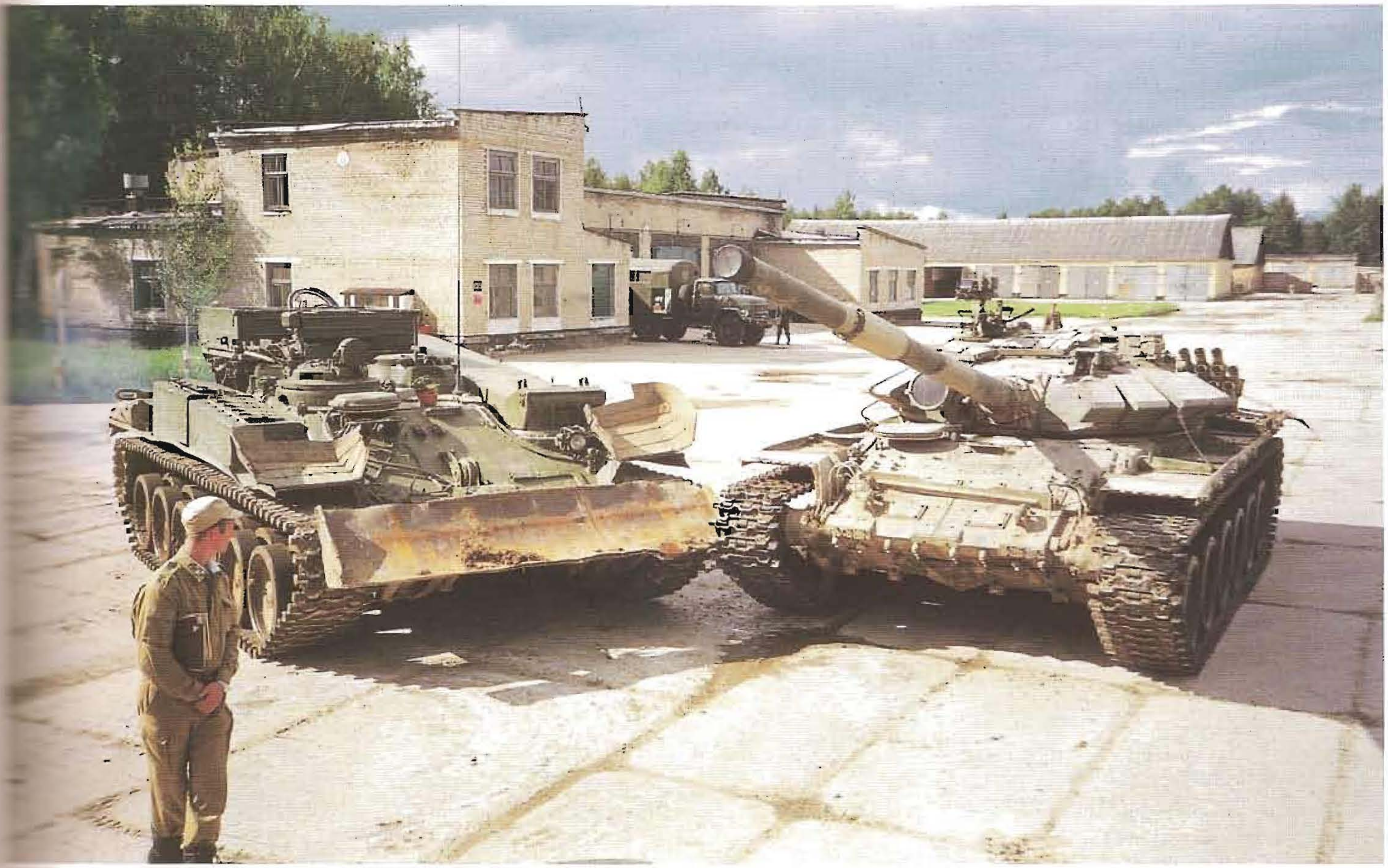
The M-84A4 Snajper has many substantial differences from the n M-84A since many components such as wheels, and the turret castin to be locally developed. It also has an improved fire control system. (Gander)



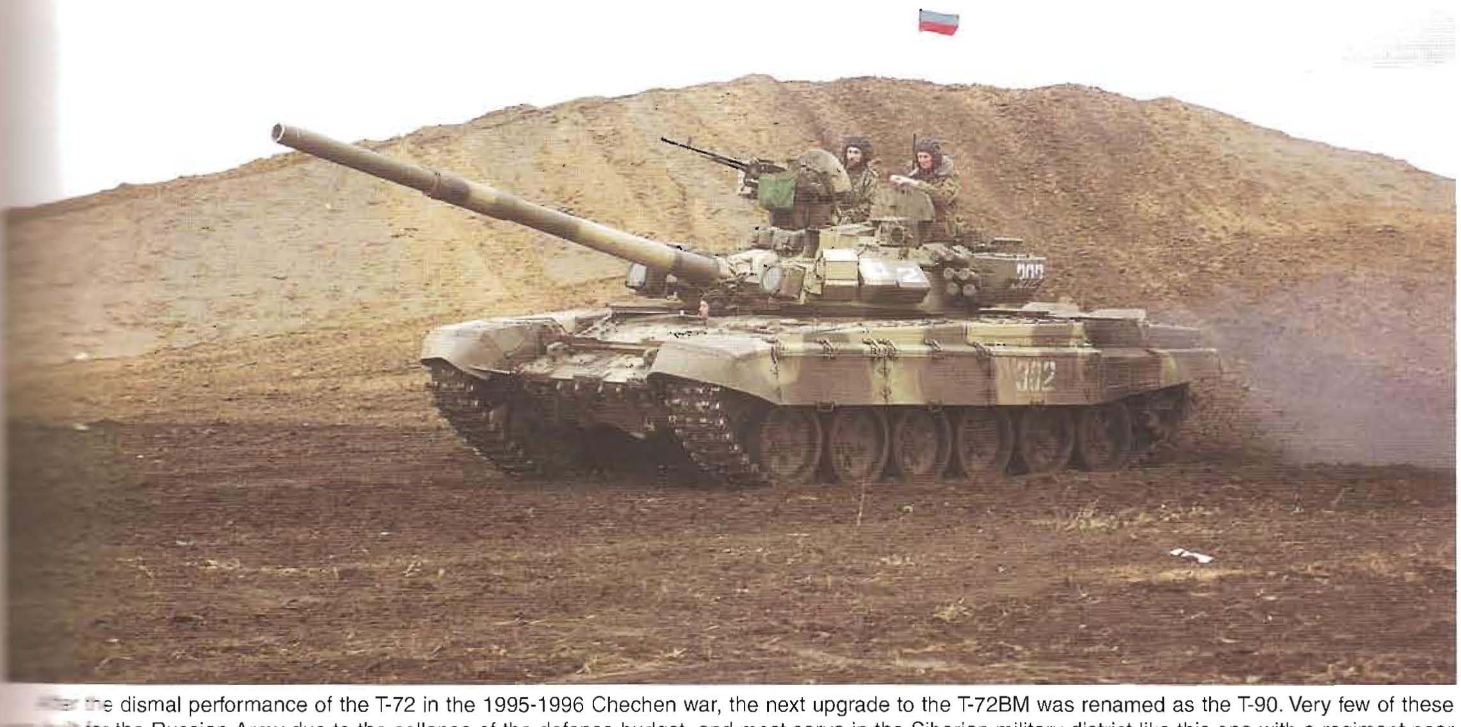
Due to the problems producing a cast turret as well as the limited protection of the existing design, Croatia developed a substantially designed M-84 called the M-95 Degman. This has a new slab-sided, welded turret. (Terry Gander)



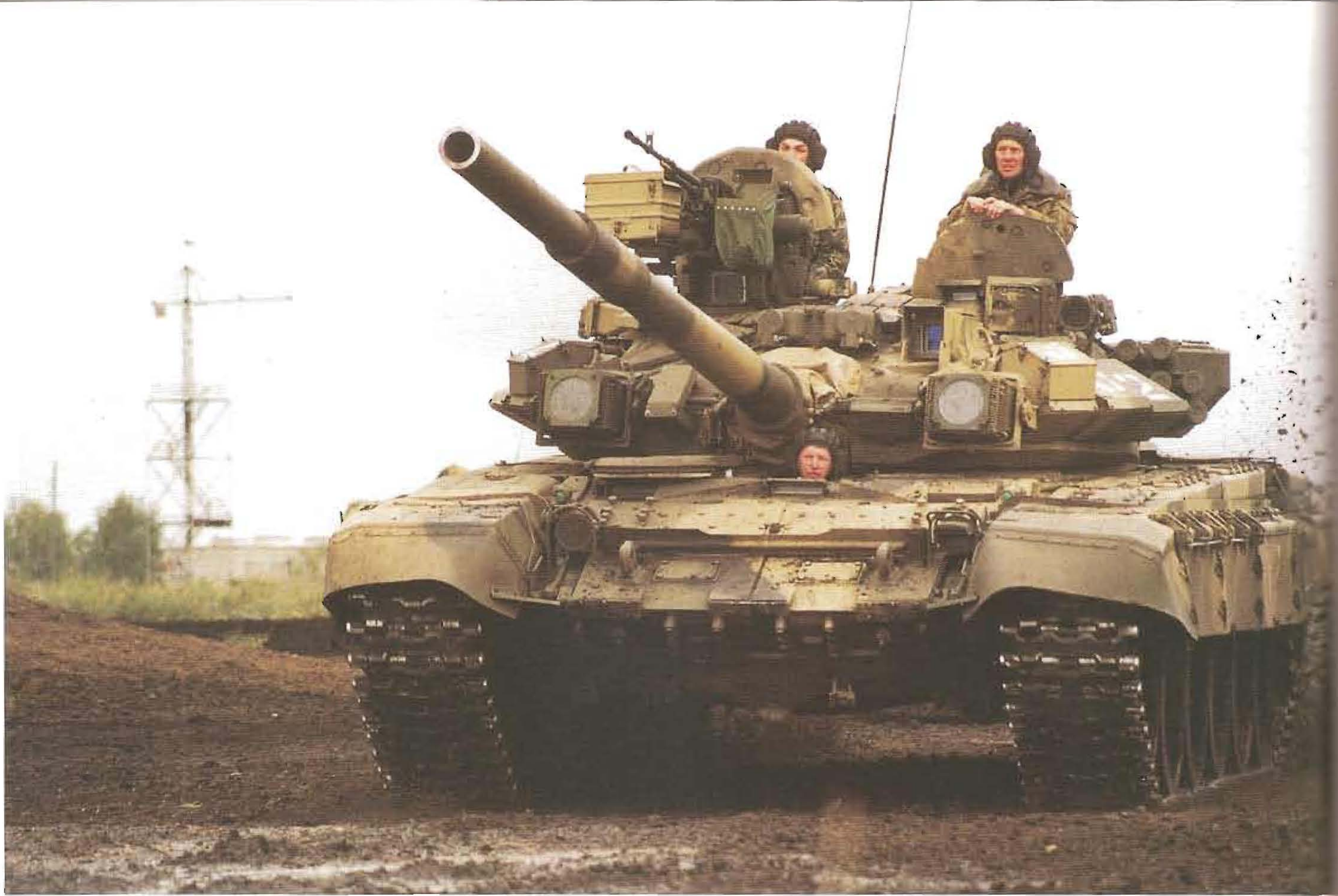
The Degman hull is substantially simila the normal T-72M/M-84, but as is evident in



The final version of the T-72 manufactured in the Soviet Union was the T-72BM. This variant was distinguished by the use of the newer Kontakt-5 reactive armor, as well as a new gunner's sight. Here, a BREM-1 recovery vehicle services a T-72BM at the armor base at Kubinka outside Moscow. (Jim Kinnear)



After the dismal performance of the T-72 in the 1995-1996 Chechen war, the next upgrade to the T-72BM was renamed as the T-90. Very few of these were built for the Russian Army due to the collapse of the defense budget, and most serve in the Siberian military district like this one with a regiment near Omsk.

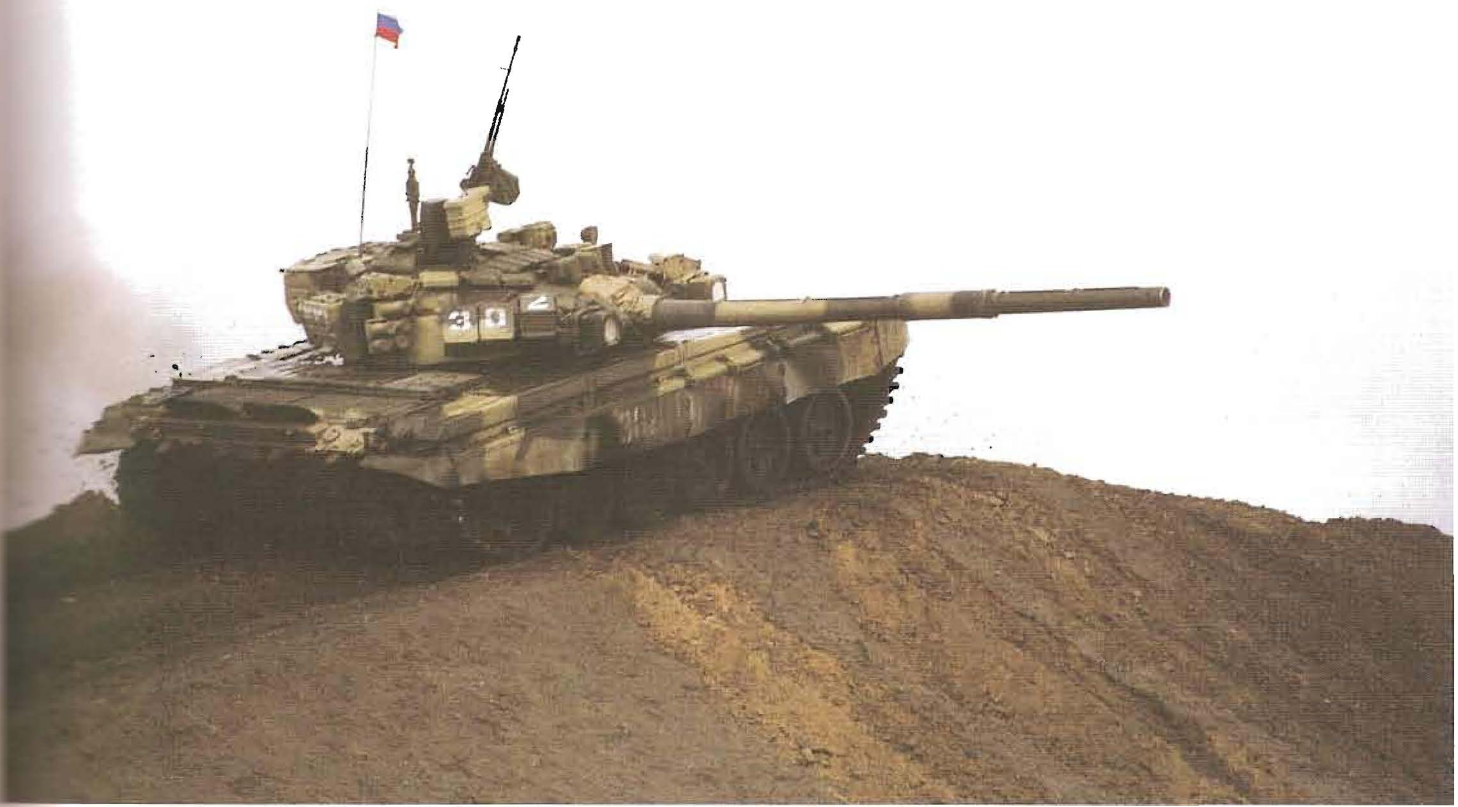


The T-90 can be most easily distinguished from the T-72BM by the two Shtora dazzlers fitted on either side of the main gun. These are part of a
self-protection system designed to defeat anti-tank guided missiles.

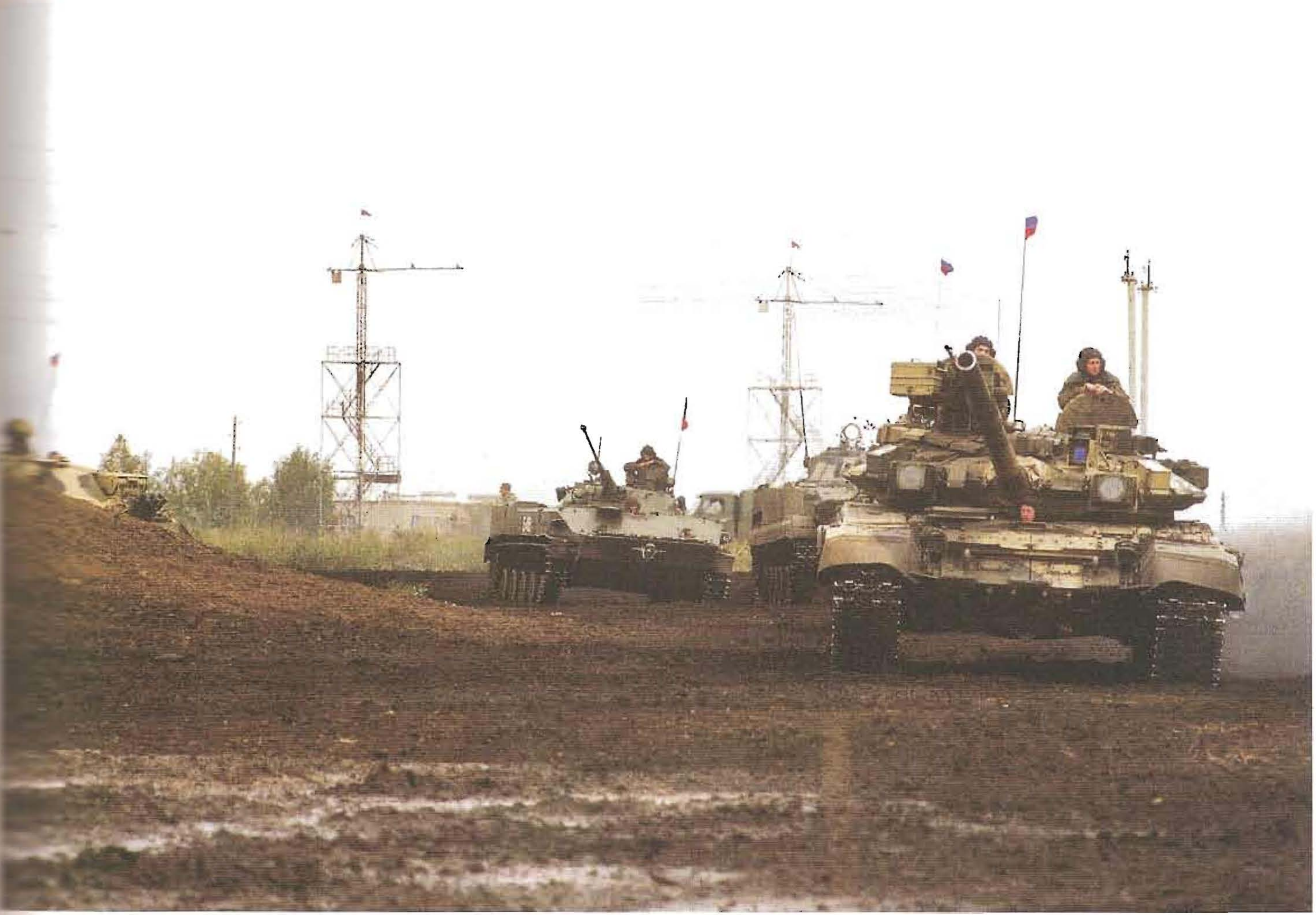
Like most Russian tanks, the T-90 is designed for crossing water obstacles with little or no preparation. Here a T-90 in the Siberian military districts fords a water obstacle at a training facility near Omsk.

Another difference between the T-90 and the T-72BM is the use
remote control machine gun station over the commander's cupola, sim
the style used on the T-64 and T-80 family. In many respects, the T-9
aimed to switch the T-7 family from an economy configuration to a high-
configuration to offer performance more similar to the more expensive T-
series.

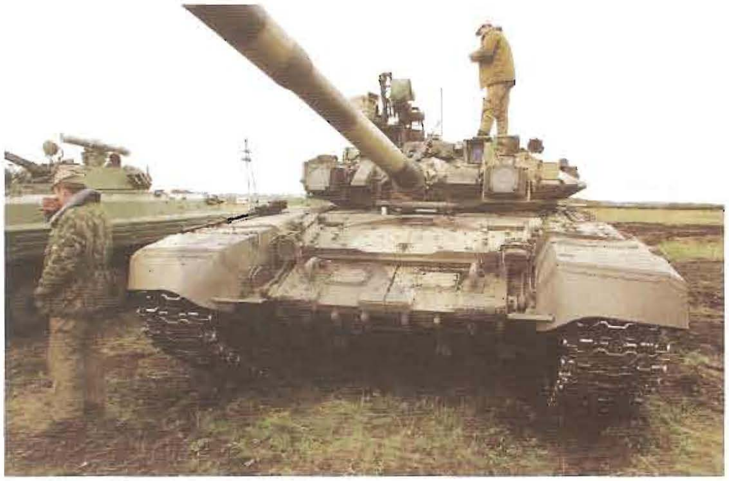
A T-90 [illegible]



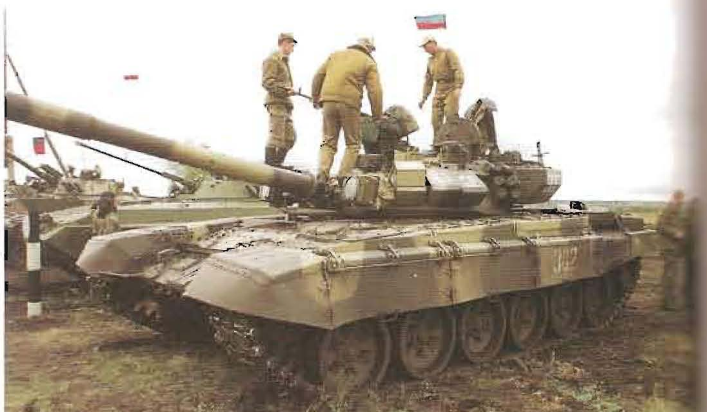
A good view of a T-90 on a terrain obstacle. The basic chassis of the T-90 is very similar externally to the earlier T-72 family, and is most easily distinguished by the square reactive armor panels on the hull sides.



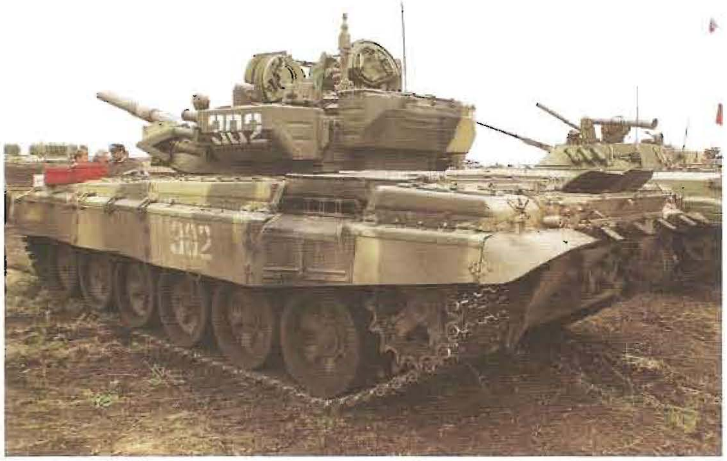
A T-90 leads a column of armored vehicles during a firepower demonstration near Omsk. Immediately behind is a BMP-3, and a BMD-3 airborne infantry vehicle.



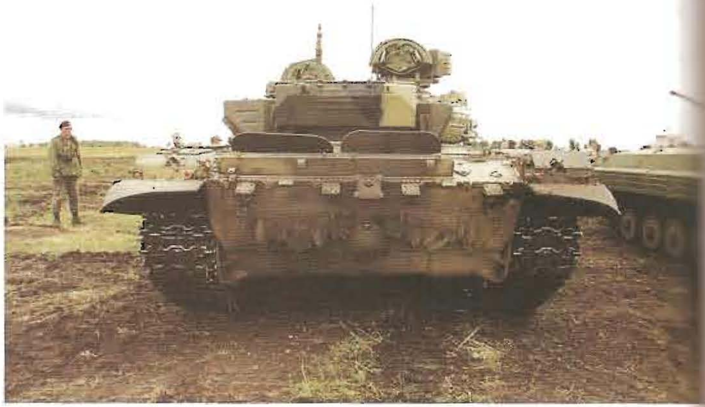
This head-on shot of a T-90 with a unit in Siberia shows the features typical of the Russian Army tanks. The new array of Kontakt-5 reactive armor is very evident in this view.



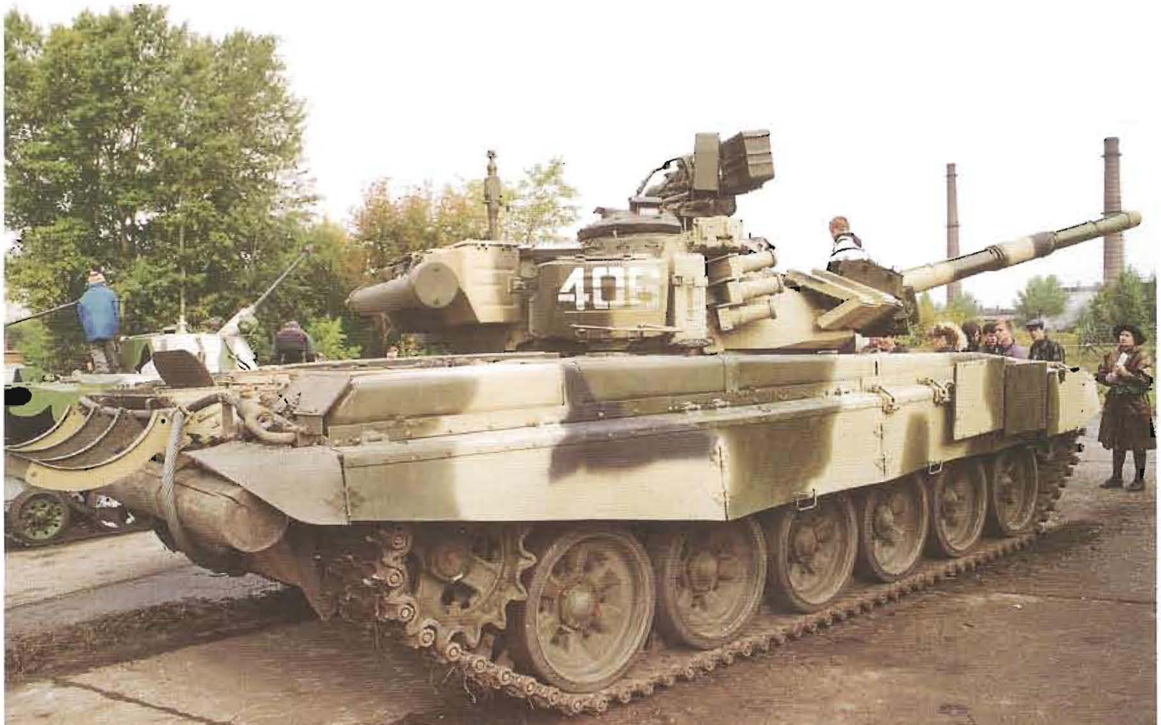
A T-90 in Siberia after exercises. Interestingly enough, this vehic had the side Kontakt-5 explosive reactive armor panels removed, sh the reinforced attachment points.



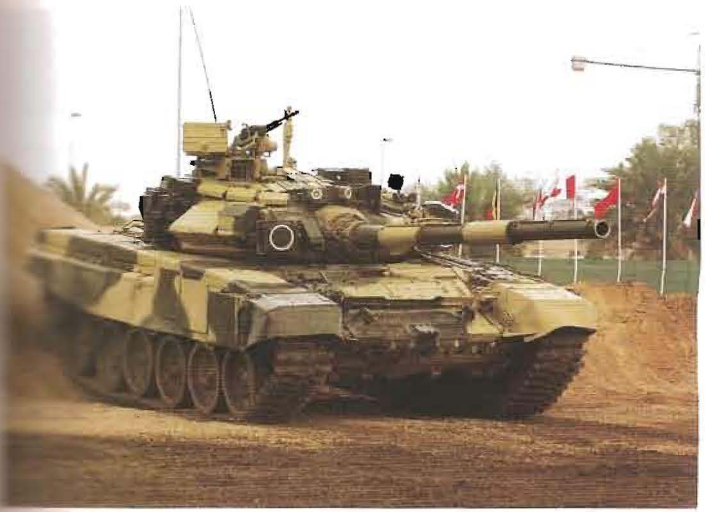
The T-90 has introduced a number of configuration changes on the turret, particularly in terms of the stowage bins and smoke mortars.



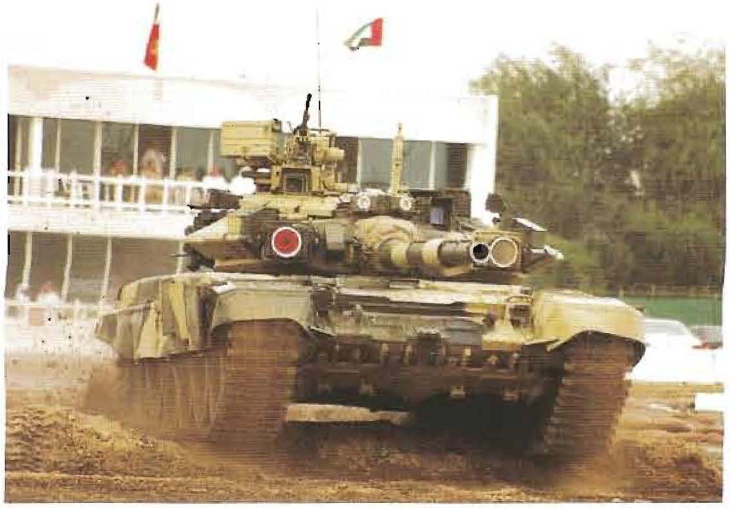
This walk-around of a T-90 shows the characteristic features of the family, which has changed little in the T-90 except for the rounded corne the radiator opening flap.



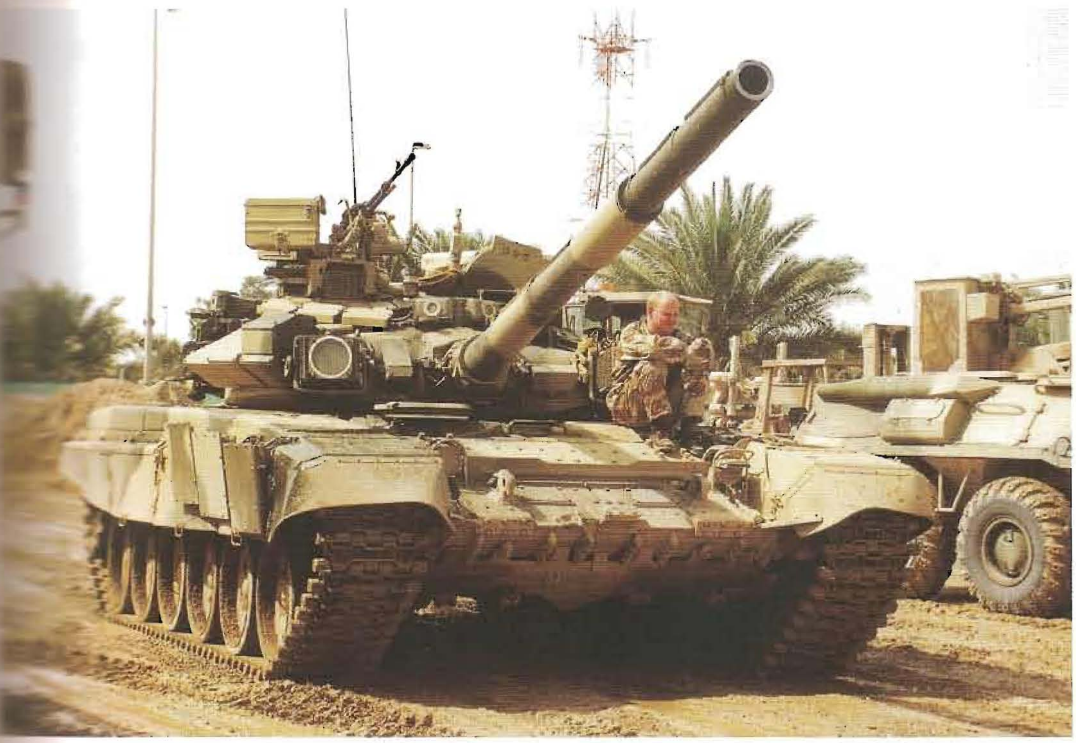
A clear view of a T-90 display at the Polyot plant Omsk during an exhibitic The camouflage is standard Russian



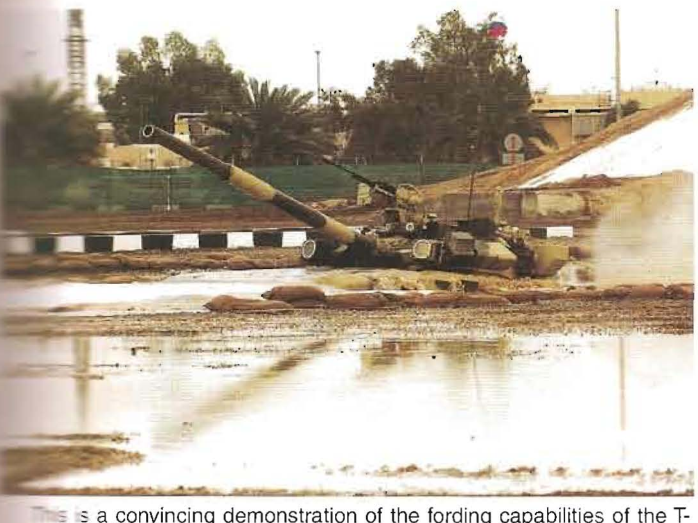
The T-90 has been extensively demonstrated on the international arms market in hopes of gaining a major export sale. This T-90S is being demonstrated in the United Arab Emirates.



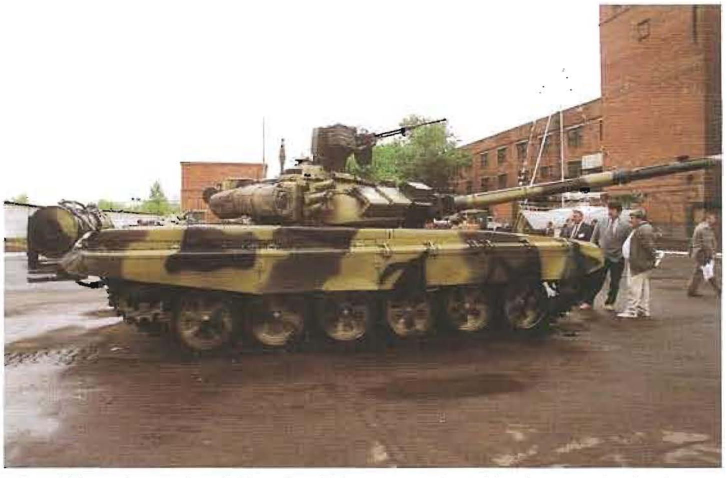
This interesting shot shows the Shtora dazzler in operation. This system emits a modulated infrared signal that is intended to confuse the tracker on wire-guided anti-tank missile launchers, causing the missile guidance system to mis-direct the aim of the missile.



A T-90S on display in the UAE with a BTR-80 nearby.



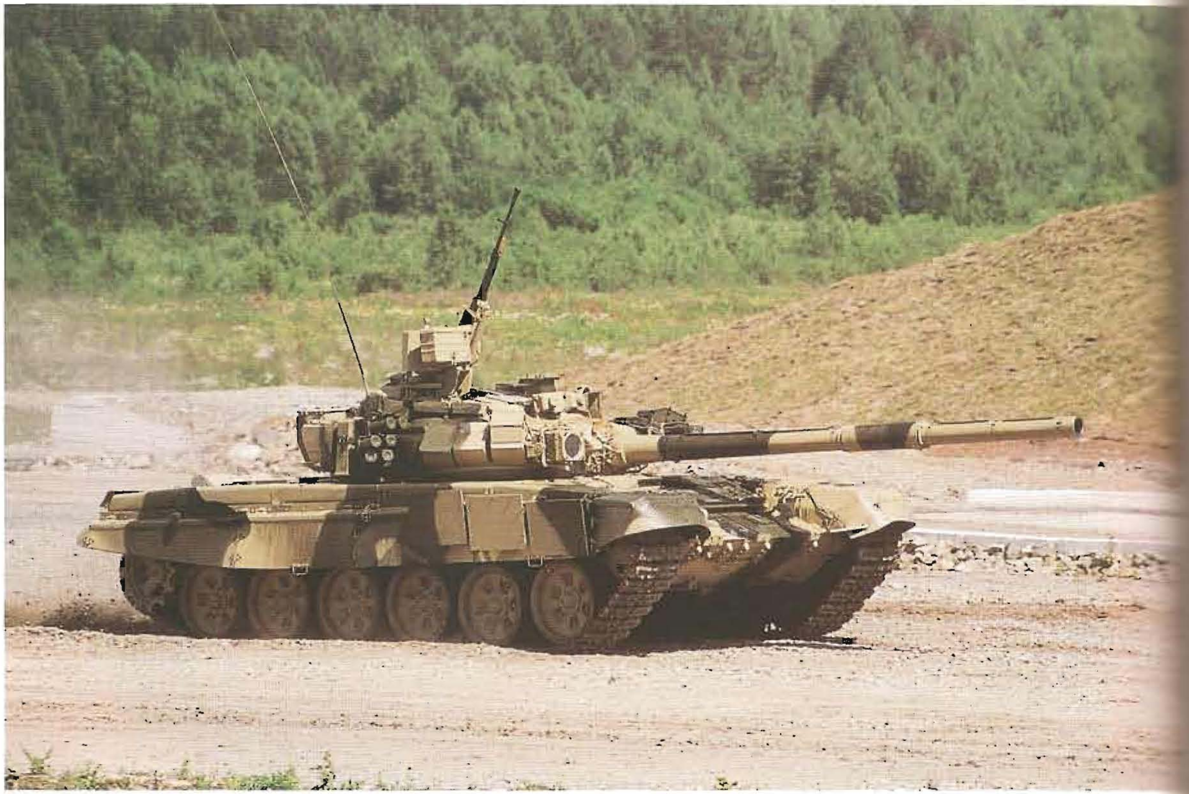
This is a convincing demonstration of the fording capabilities of the T-90, though one might surmise that this is not of special concern in desert climes like the UAE.



Although nearly all Russian T-90s are painted in the standard scheme of sand-gray, black and olive green, there are some exceptions like this T-90 that was repainted for an exhibition in Omsk in 1999. A Yellow-green shade has been substituted for the usual sand-gray.

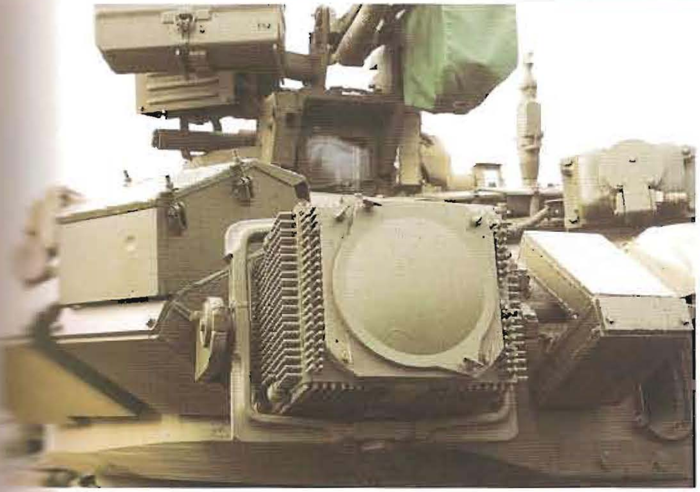
A T-90 conducts a fording demonstration at a range outside Nizhni-Tagil in July 2000. The T-90 is built in the neighboring city.

A T-90 surmounts a vertical step obstacle at a range near Nizh in 2000. This provides another view of the track.

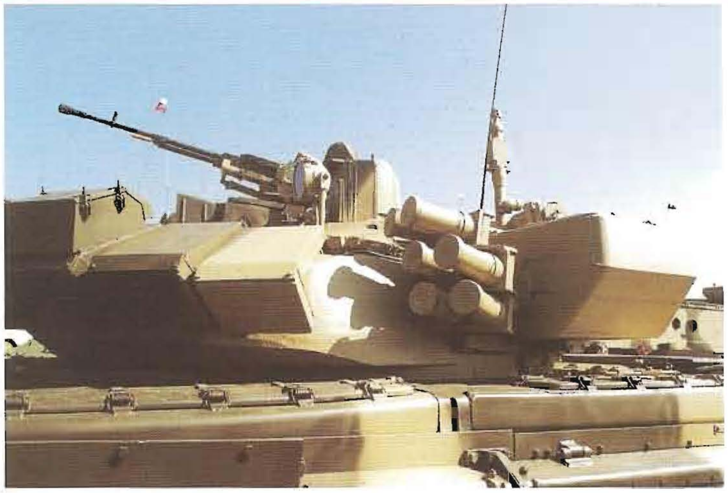


A new T-90 on demonstration near Nizhni-Tagil in 2000. Careful inspection reveals that it is fitted with a different type of track than the usual type.

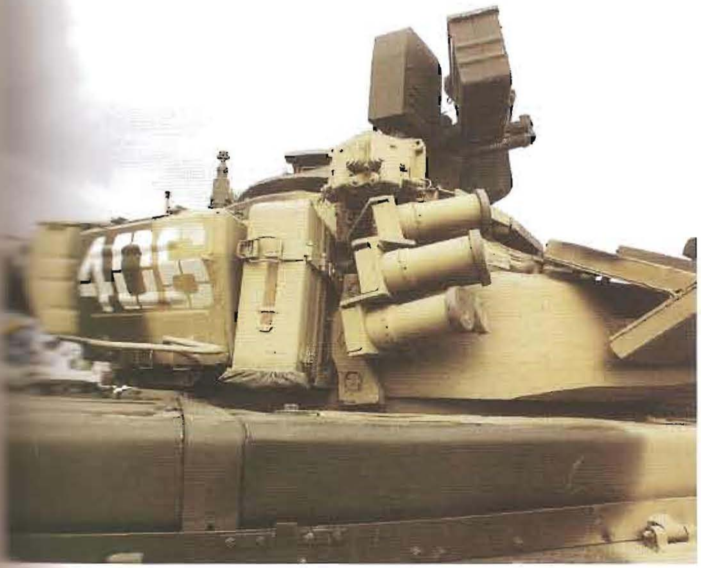
A number of new powerplants are being examined to increase



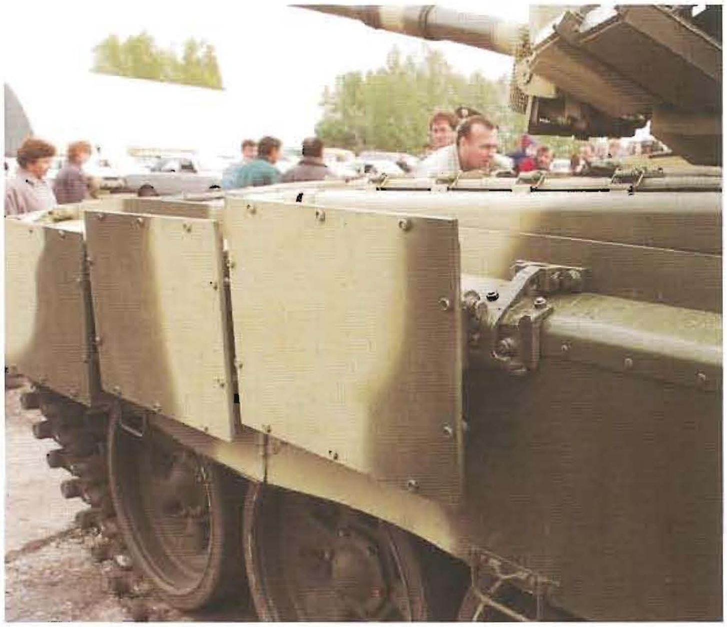
The T-90 can be distinguished from the earlier T-72BM by the TshU-1-7 dazzler mounted on the turret front, part of the Shtora self-defense system. The pins emanating from the box are heat sinks intended to help cool the system when in operation.



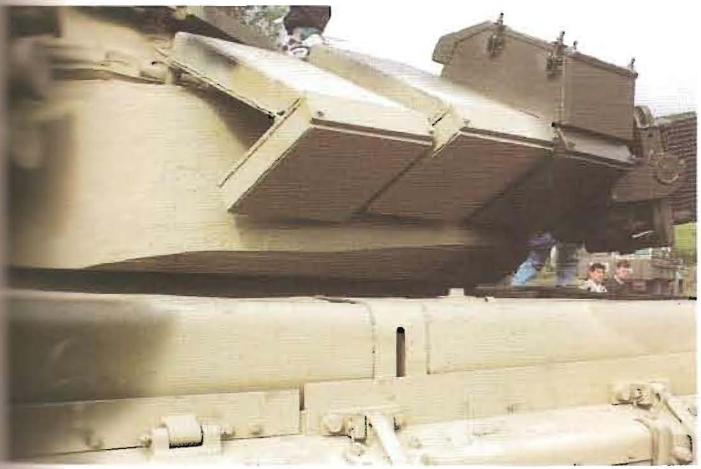
A detail view of the left front of the turret showing the Kontakt-5 reactive armor panels and the Tucha smoke dispensers. This is a late production T-90 with the new gunner's sight.



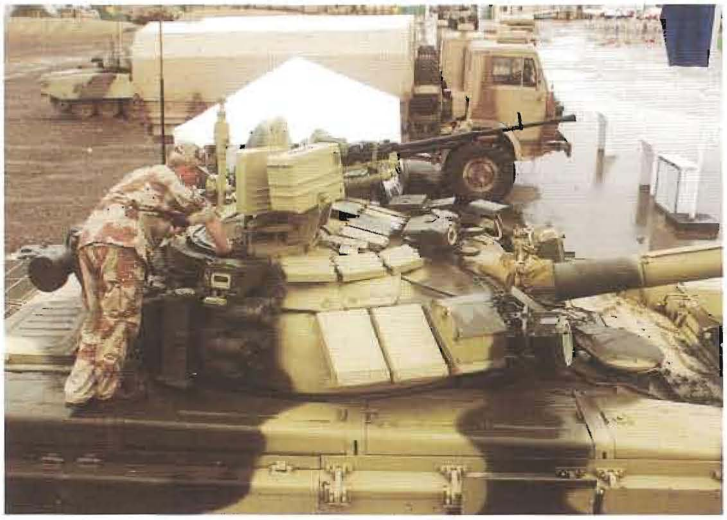
A detail view of the right side of the turret showing the extra machine gun ammunition container, and the stowage bin. The device immediately above the Tucha smoke mortars is a laser warning receiver, one of three sensors that form part of the Shtora self-defense system.



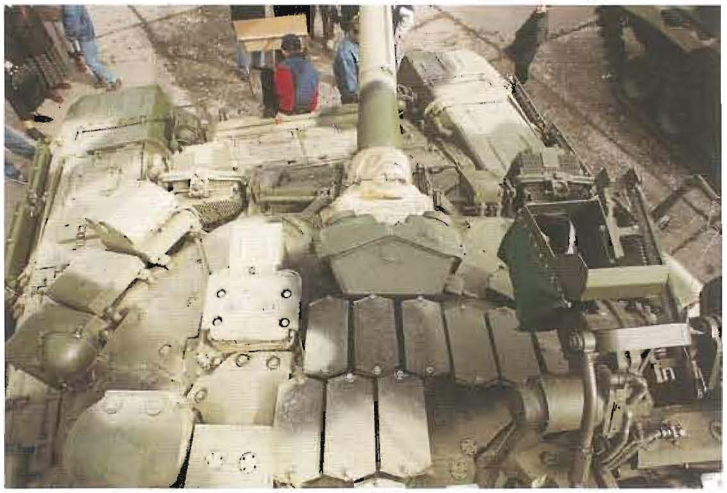
A close-up view of the attachments for the Kontakt-5 reactive armor panels on the left front side of the tank. A fourth panel can be fitted to the side, though T-90s are often seen with only three per side.



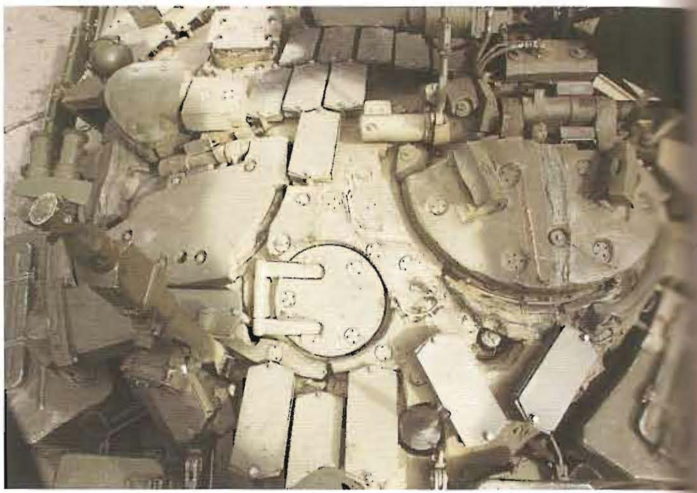
A detail view of the Kontakt-5 reactive armor panels on the T-90. The panels are hollow, and the explosive packets for the defense system are inserted into the cavities in time of war.



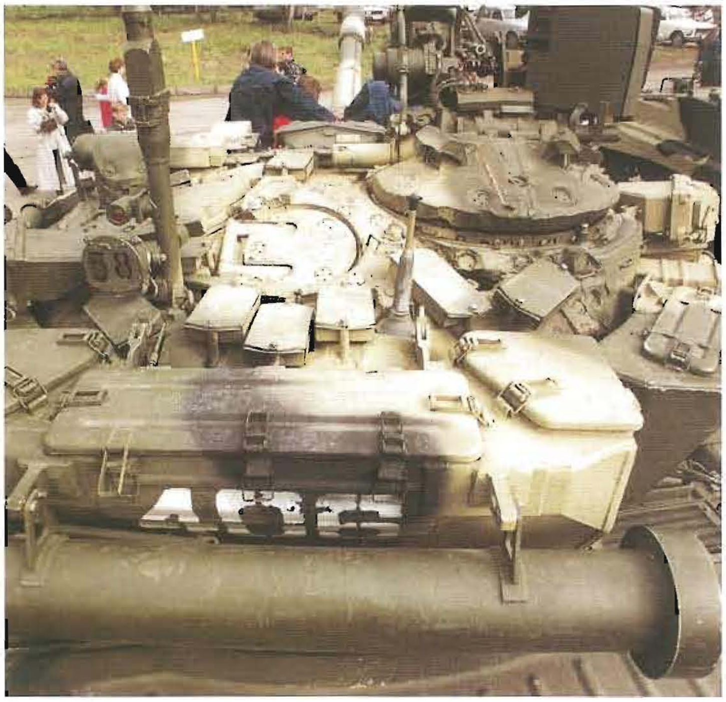
A useful overview of the T-90 showing the layout of the turret.



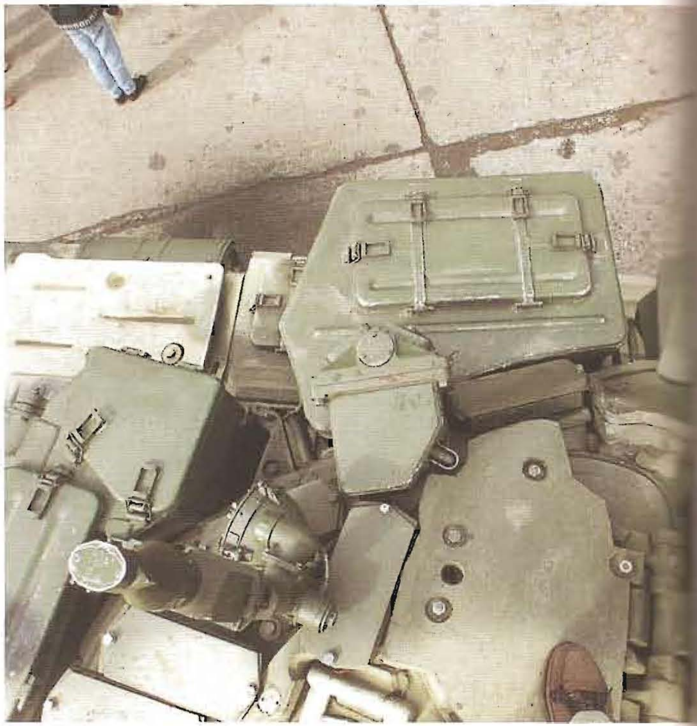
A detail view of the T-90 turret showing the layout of the reactive armor on the roof, as well as the machine gun mount over the commander's station.



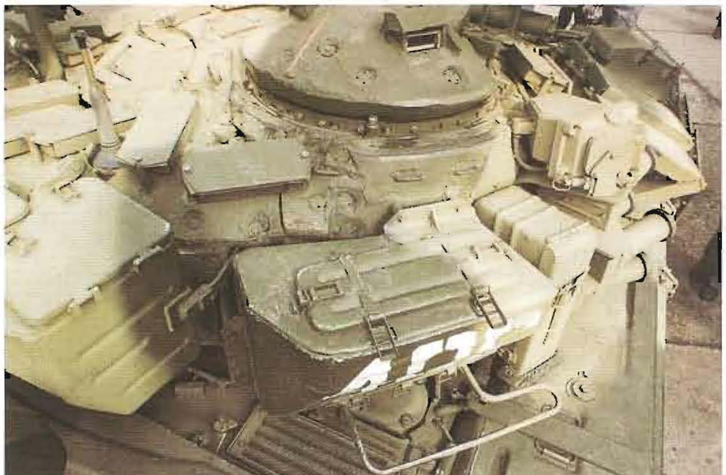
A view further back on the turret showing the commander's ha the right, gunner's hatch on the left, and the shell ejection port in the ce

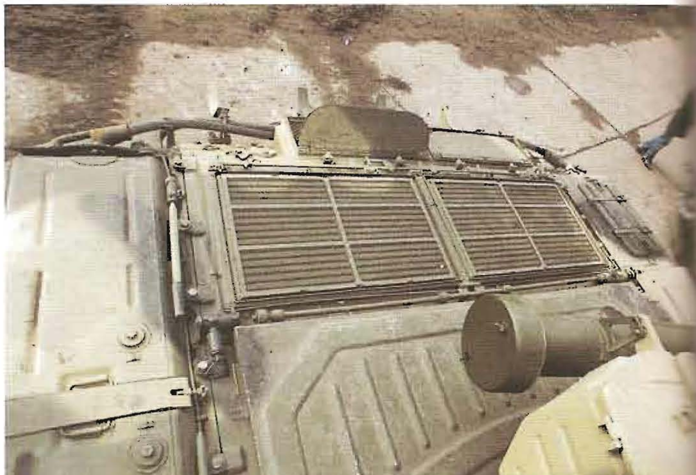


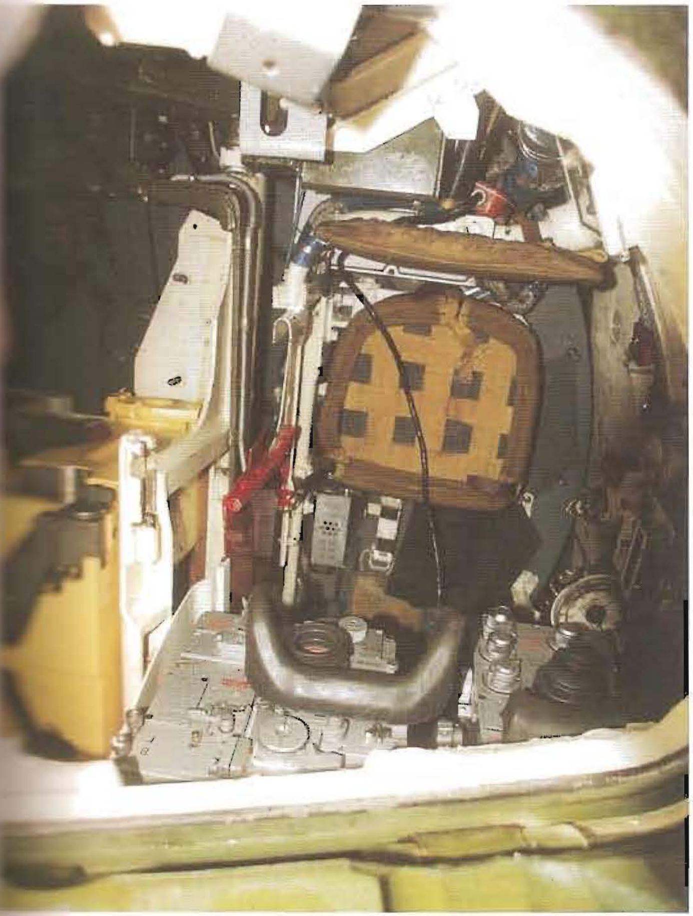
A view of the turret rear showing the stowage for the snorkel and the rear stowage bin. Some T-90s have an additional stowage rack on the rear instead of snorkel stowage.



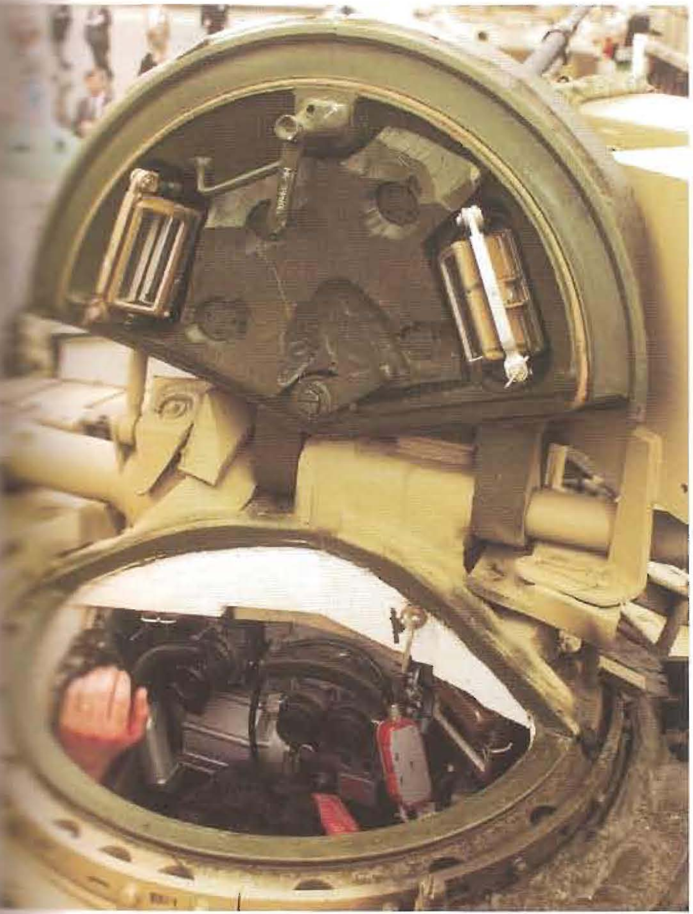
A detail view of the new stowage bin fitted on the left turret side as as details of the cover over the gunner's hatch.



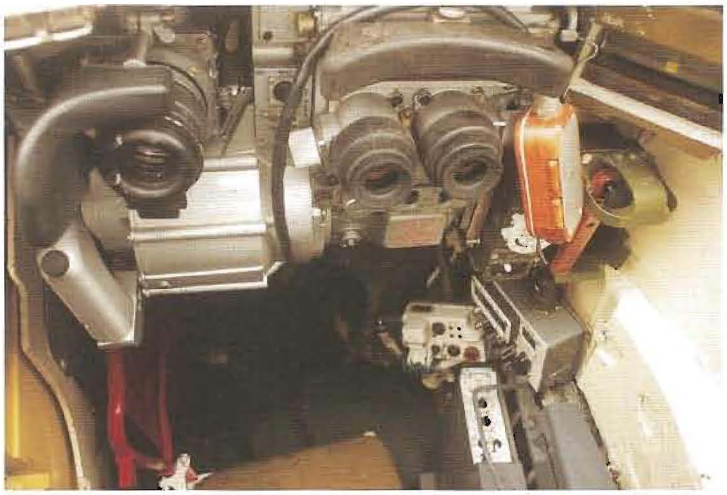




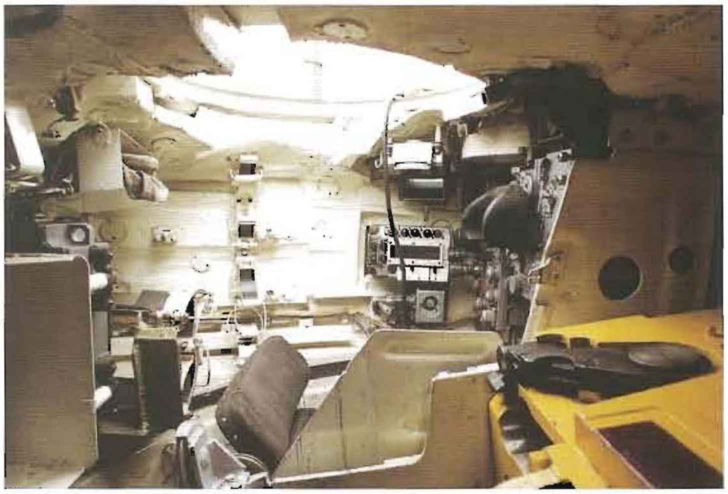
A view down inside the T-90 hatch. The T-90 is certainly the most cramped modern tank the author's have ever been inside, even smaller than [illegible]



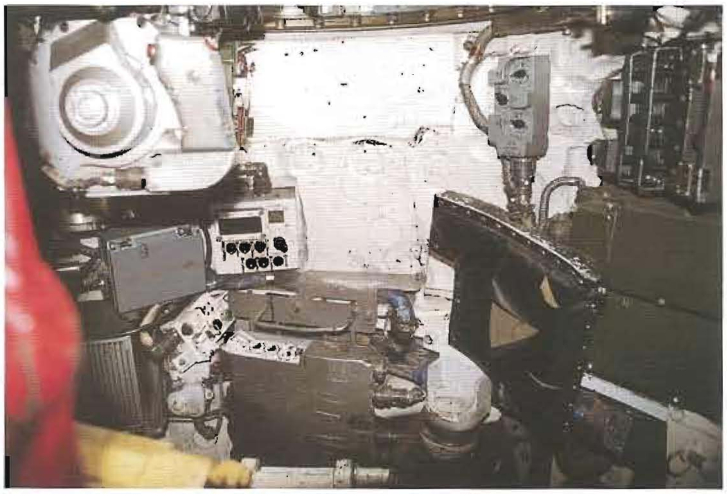
A detail view of the commander's hatch when open showing the two periscopes.



A view inside the T-90 commander's station with the sights in the center and the gun breech to the left.

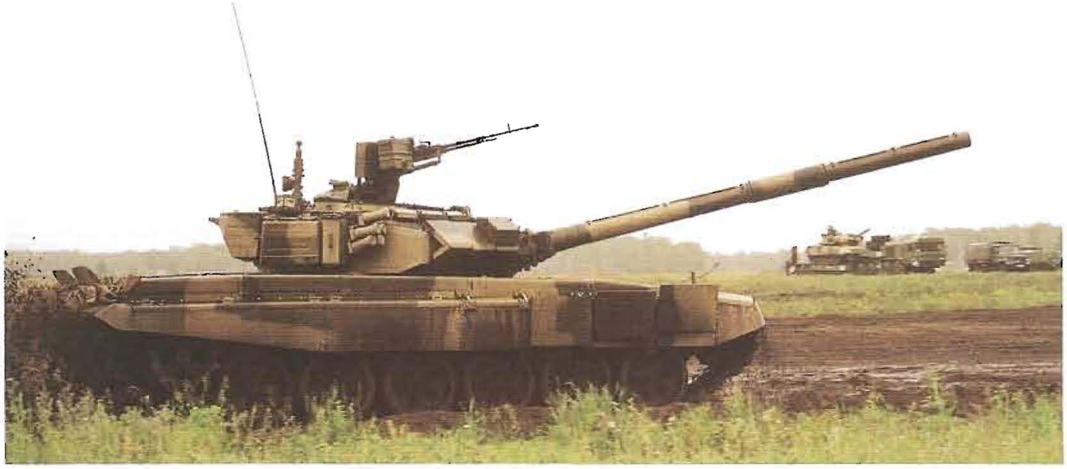


A view taken from the commander's seat looking over the gun towards the gunner's station. In combat, it would be even more cramped, as the cavities in the turret appliqué liner are for three rounds of ammunition.

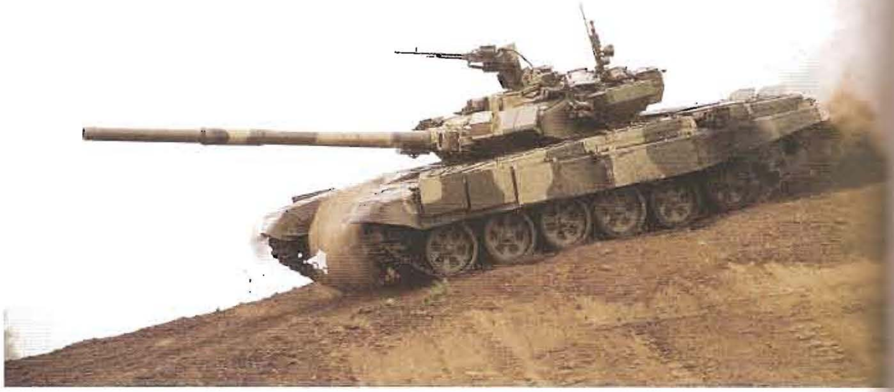


A view from the gunner's station looking over into the commander's station in the right side of the turret. Sitting in the T-90 is like being in a fighter cockpit as there is no space to move around once the hatch is closed.

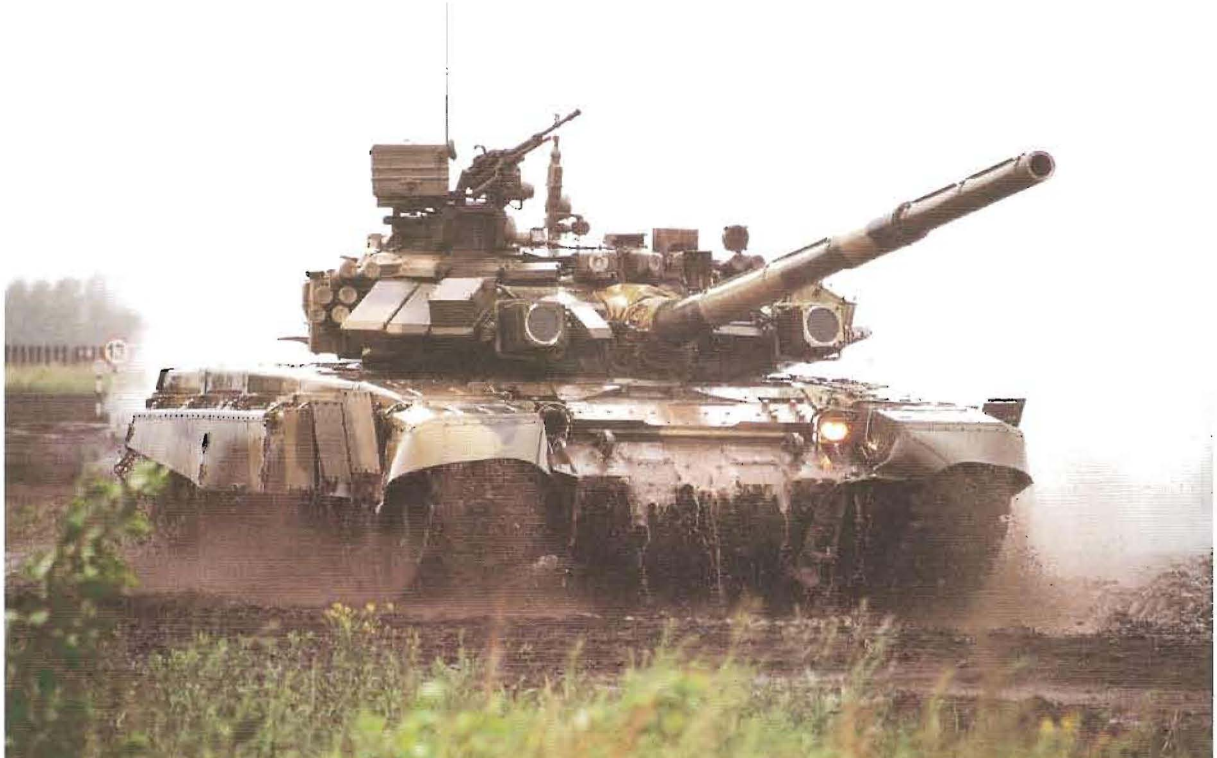
The T-90M Tank



In 1999, the T-90M was sho the first time at Omsk. The T- dispenses with the usual cast tu favor of a new welded plate turret offers better ballistic protection. version is otherwise very similar normal T-90 and T-90S, and ca distinguished by careful inspecti the photo in front of the smoke m and immediately behind the Kon ERA panels on the turret front.

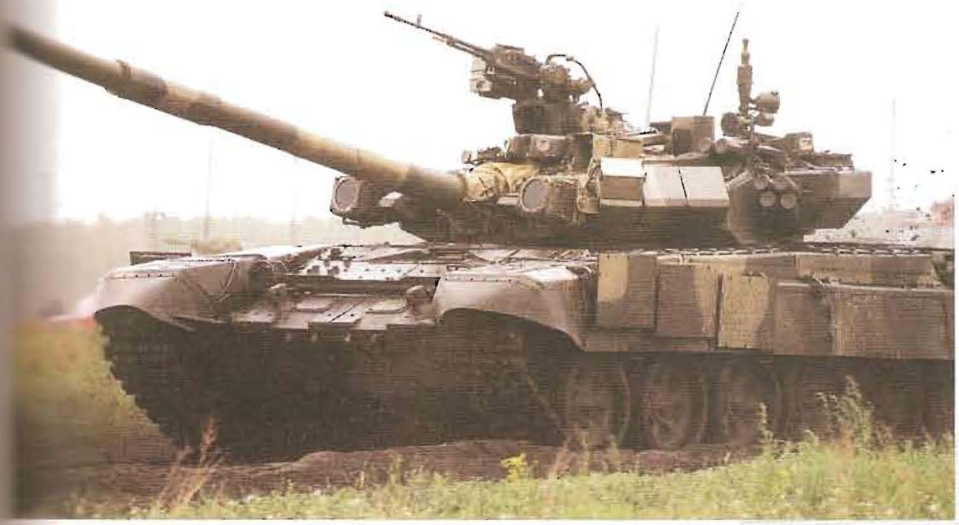


A T-90M on demonstration near Omsk in 1999. Once again, the flat plate of the turret can be seen between the smoke mortars and the front Kontakt-5 panels.

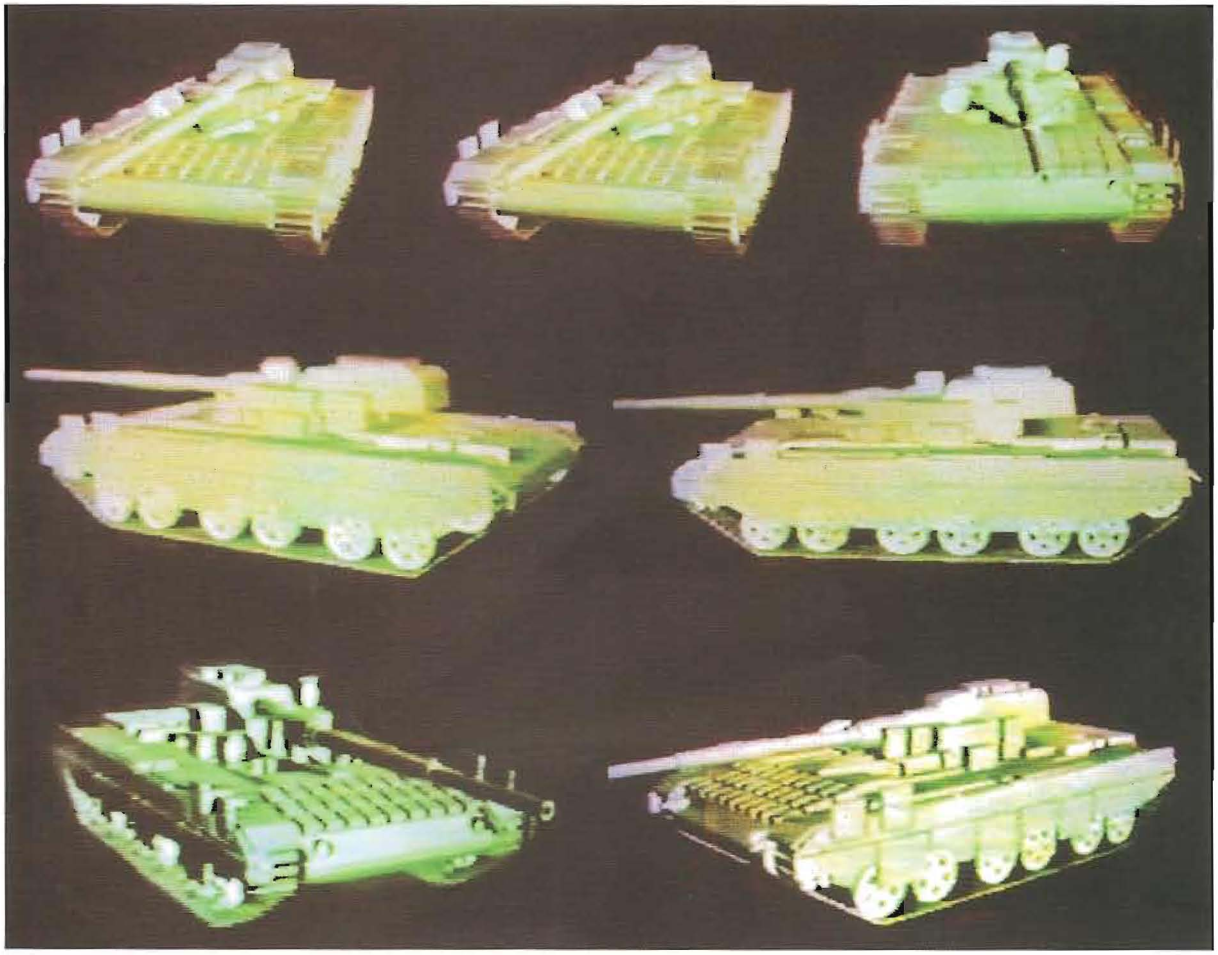


From this a the T-90M indistinguishable

This version of the T-90 series is being offered to India with a variety of powerplant options.

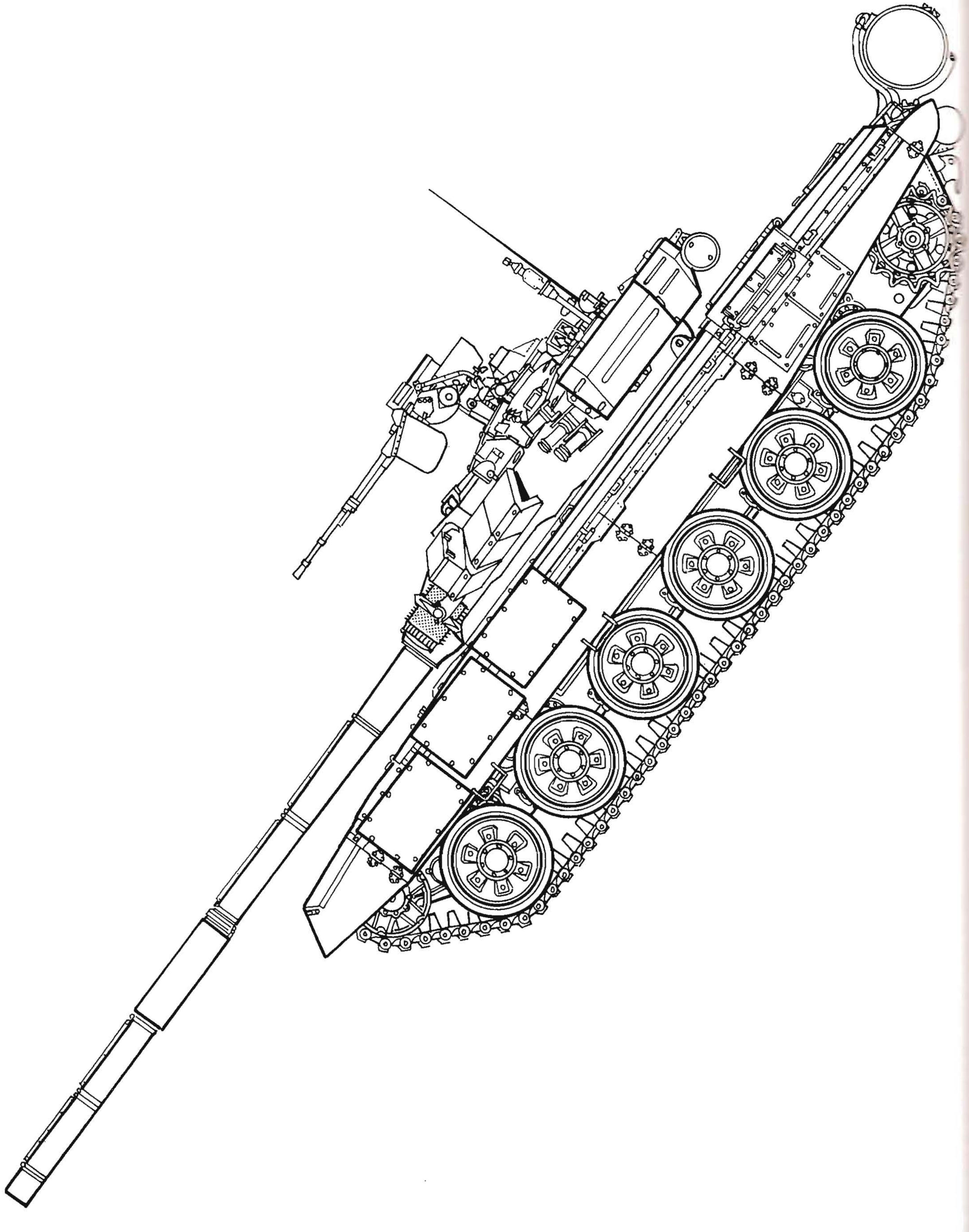


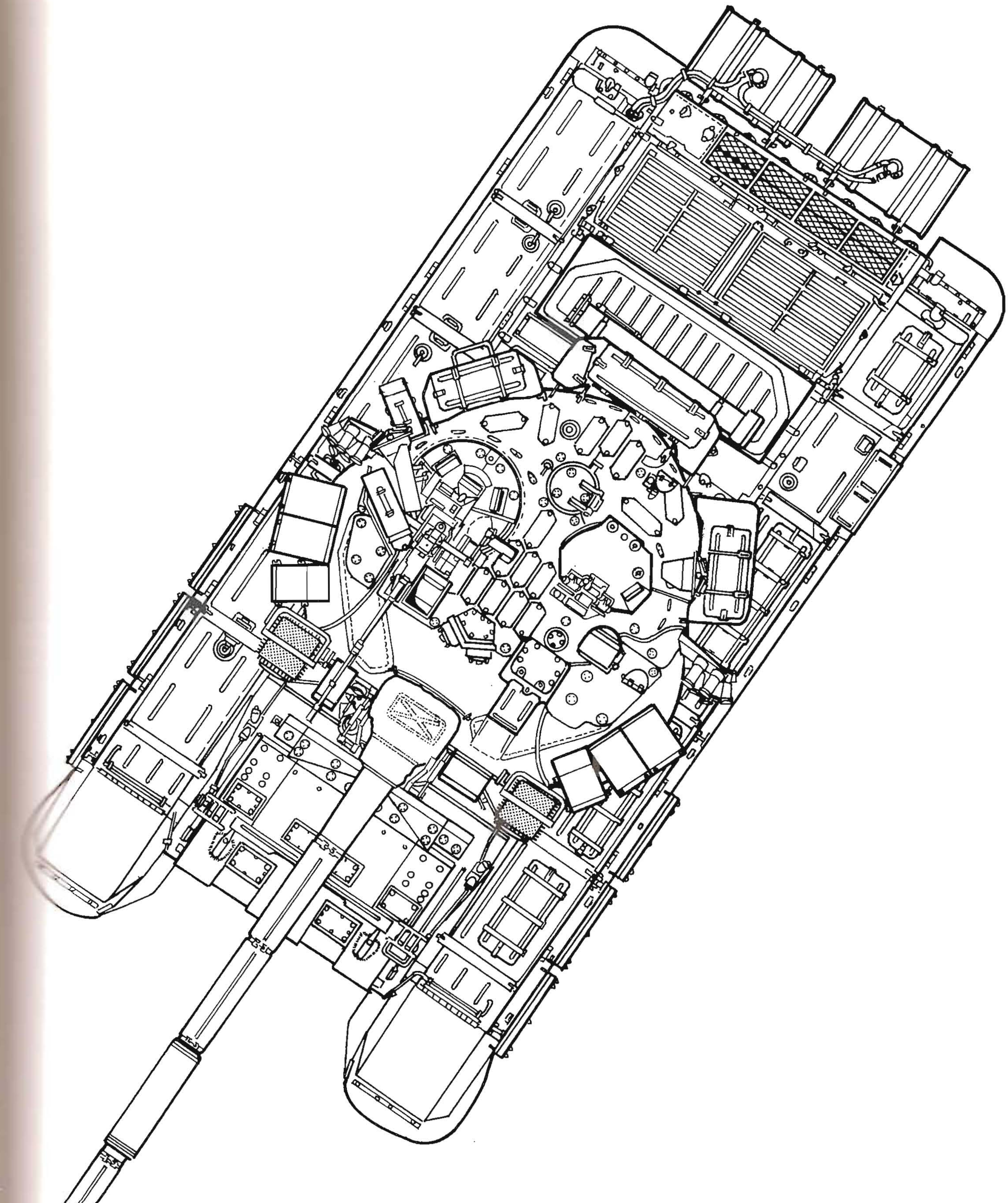
The crew of a T-90M stand in front of their tank after a demonstration in -Tagil in 1999. Russian tanker's often pull the cloth tanker's helmet off their heads during the warm summer months as it is very hot it in the normal position.

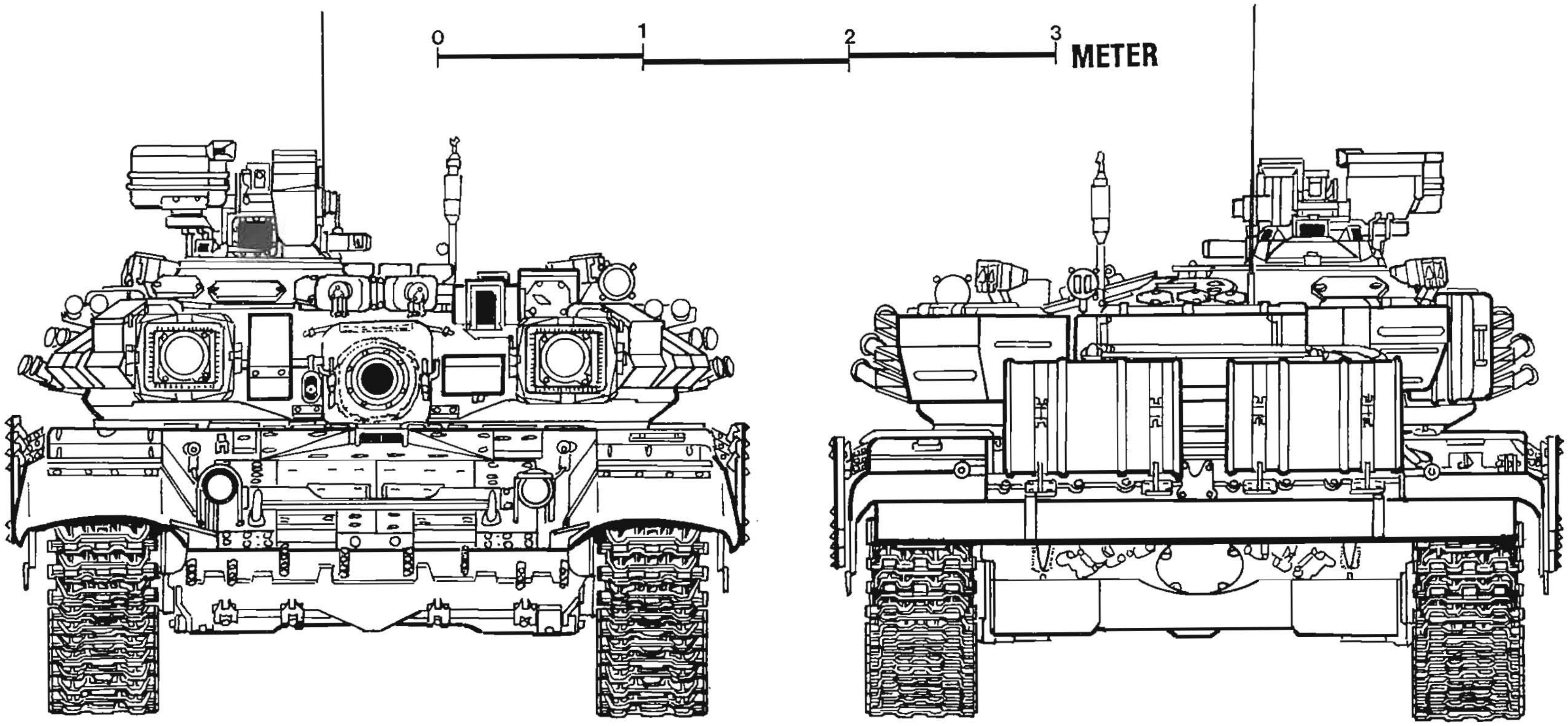


The shape of to come? This ter illustration appeared on an television in shows a concept the T-90 follow- may resemble. The has been figured with an ally mounted with all the crew the hull for better tion.

1/35 T-90 MAIN BATTLE TANK



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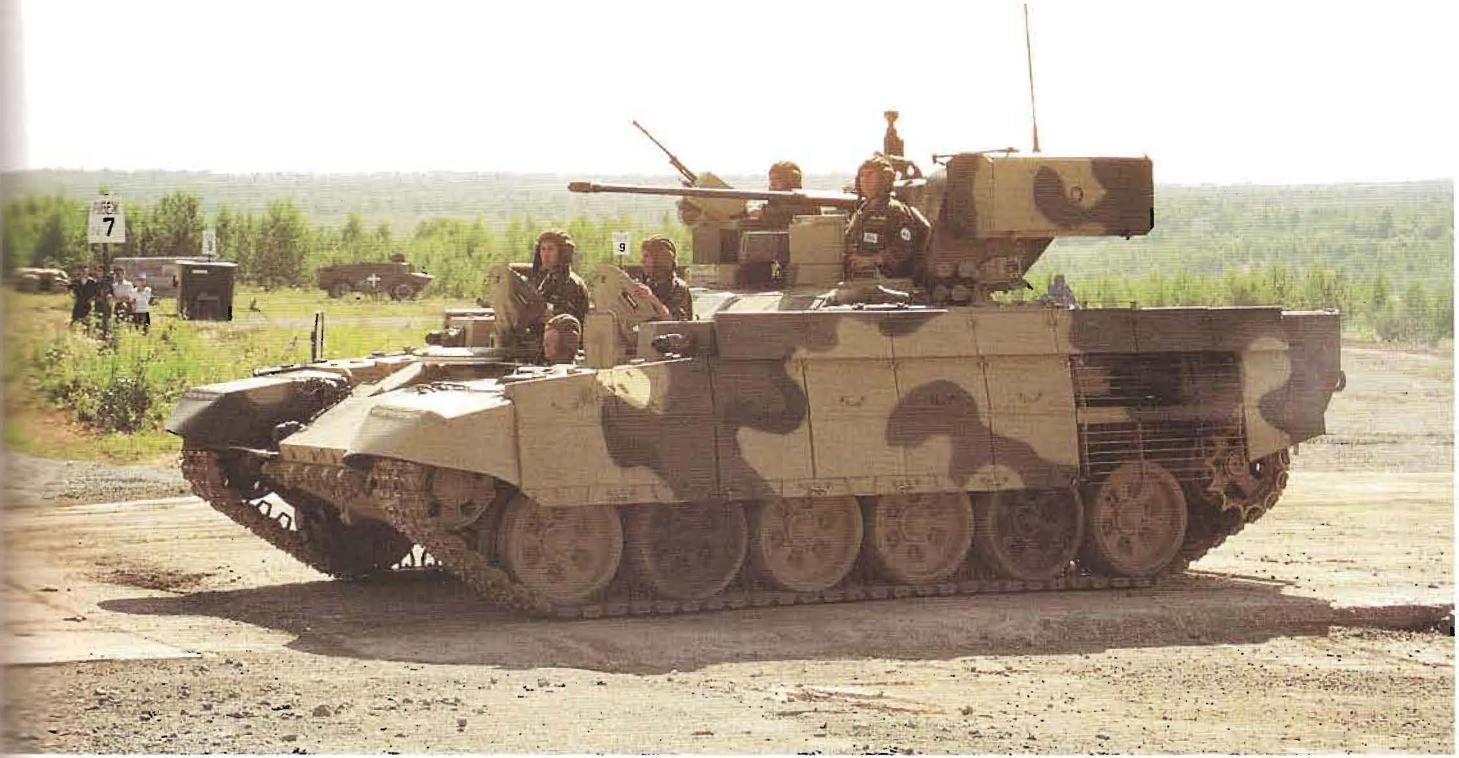
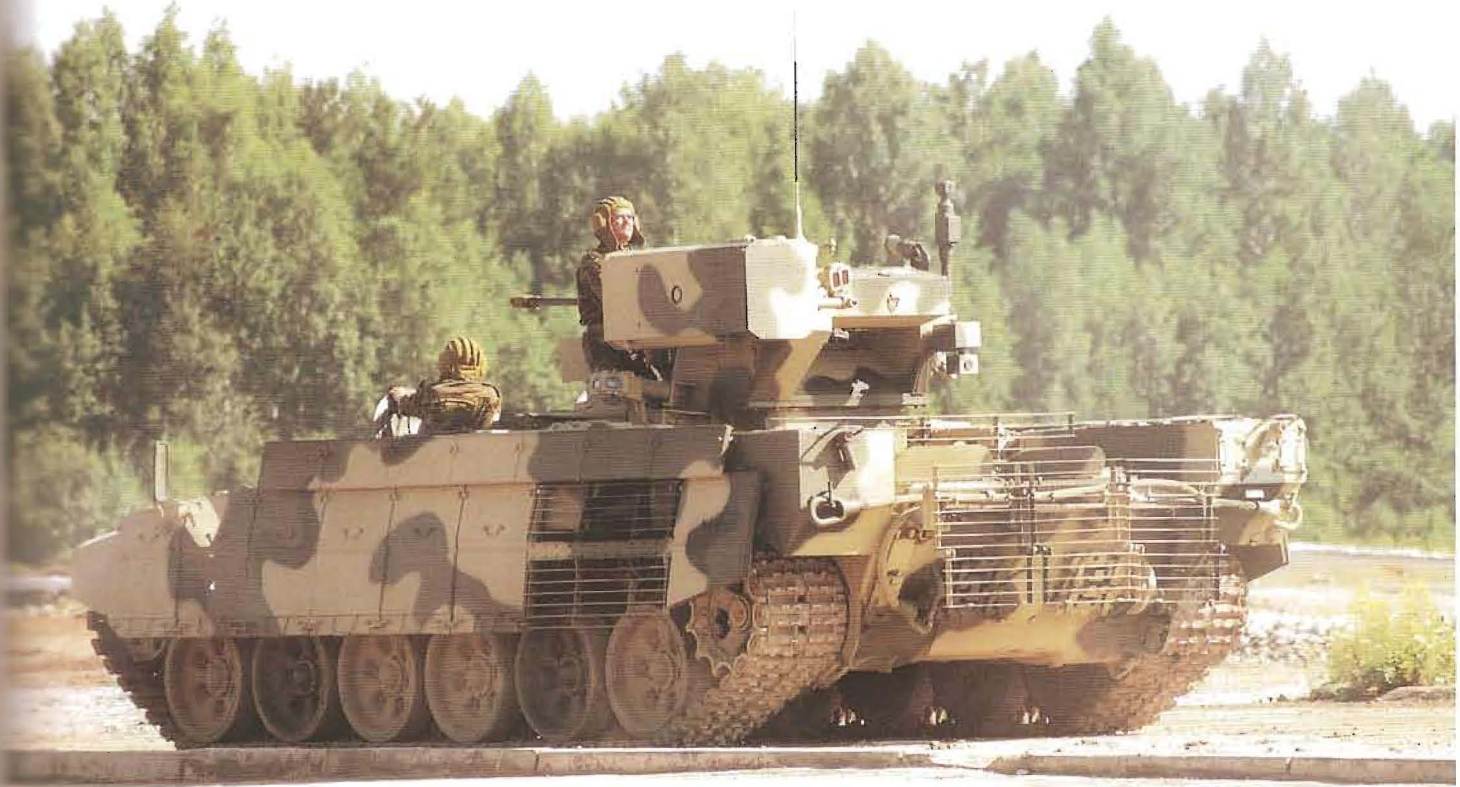
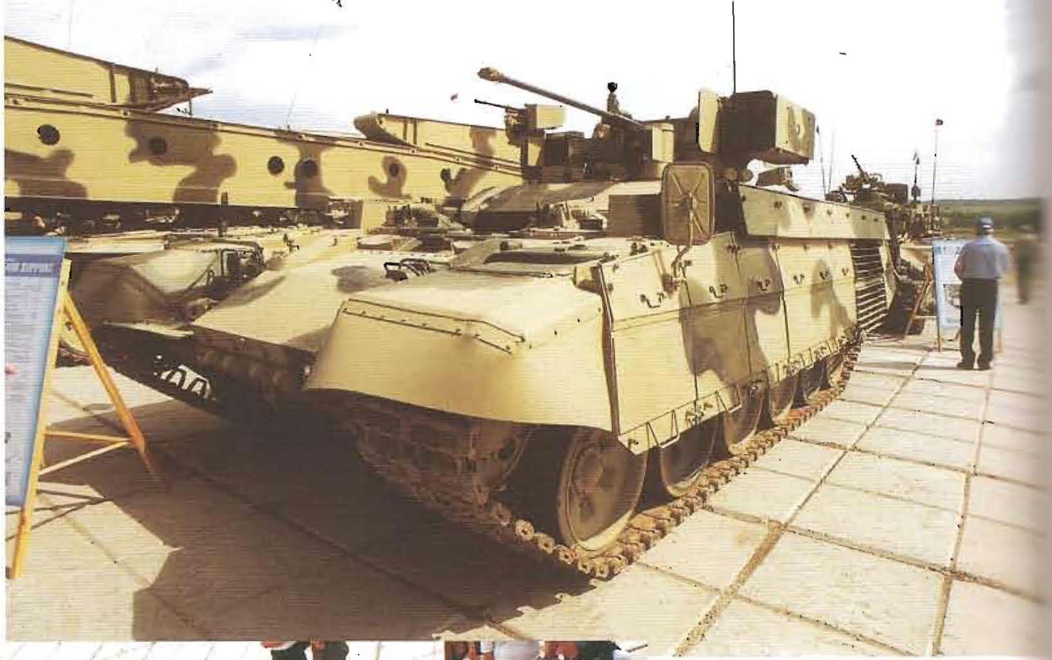


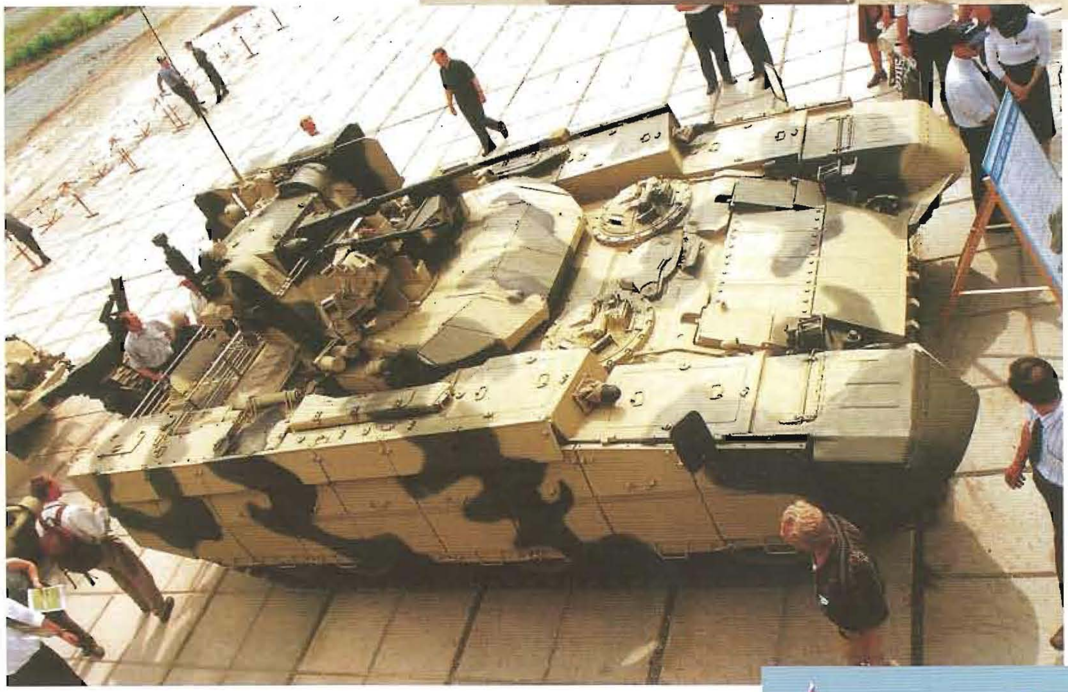
Russian experience in the two Chechen wars has convinced them that a specialized fire support vehicle is needed when fighting in built-up urban areas. The result is the BMPT, based on the T-90 tank chassis. Although this might be mistaken for a heavy infantry vehicle, in fact it does not carry an infantry squad and all the crew members are intended to fight from within the vehicle.



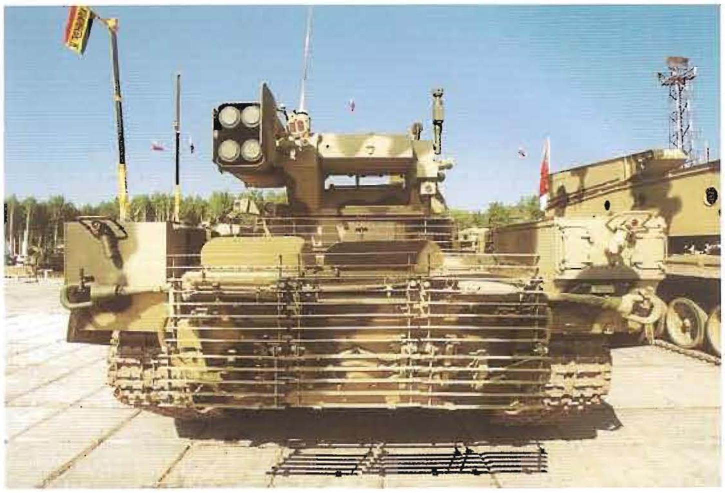
This rearview of a BMPT shows that it has protection in all directions. Many T-72 tanks were knocked out in Chechnya by RPGs fired against the thin rear armor. The BMPT is fitted with grill armor on the rear intended to defeat RPG and other similar rocket anti-tank weapons. The accent on the weapons to provide fire support in an urban environment.

The turret armament of the BMPT is centered around a 2A42 30mm autocannon on an overhead weapon station with a co-axial 30mm AG-17 grenade launcher. There is also a quad Kornet missile launcher on the left side of the weapon station. The Kornet is an anti-tank missile, but with an optional thermobaric high explosive warhead. The crew in the two hull stations operate a 30mm AG-17 grenade launcher, mounted in an armor box on the fenders at both front corners of the vehicle.

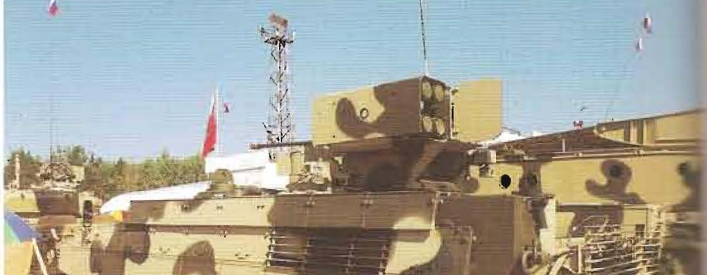




This overhead view of the B provides a better view of the wea on the vehicle. The two statio either side of the driver are fo gunners operating the AG-17 3 automatic grenade launchers fitte the sponson boxes. The 30mm gu mounted to provide high elevatio against snipers in tall buildings. T BMPT is fitted with Kontakt-5 a giving it equal or better protection th a main battle tank.

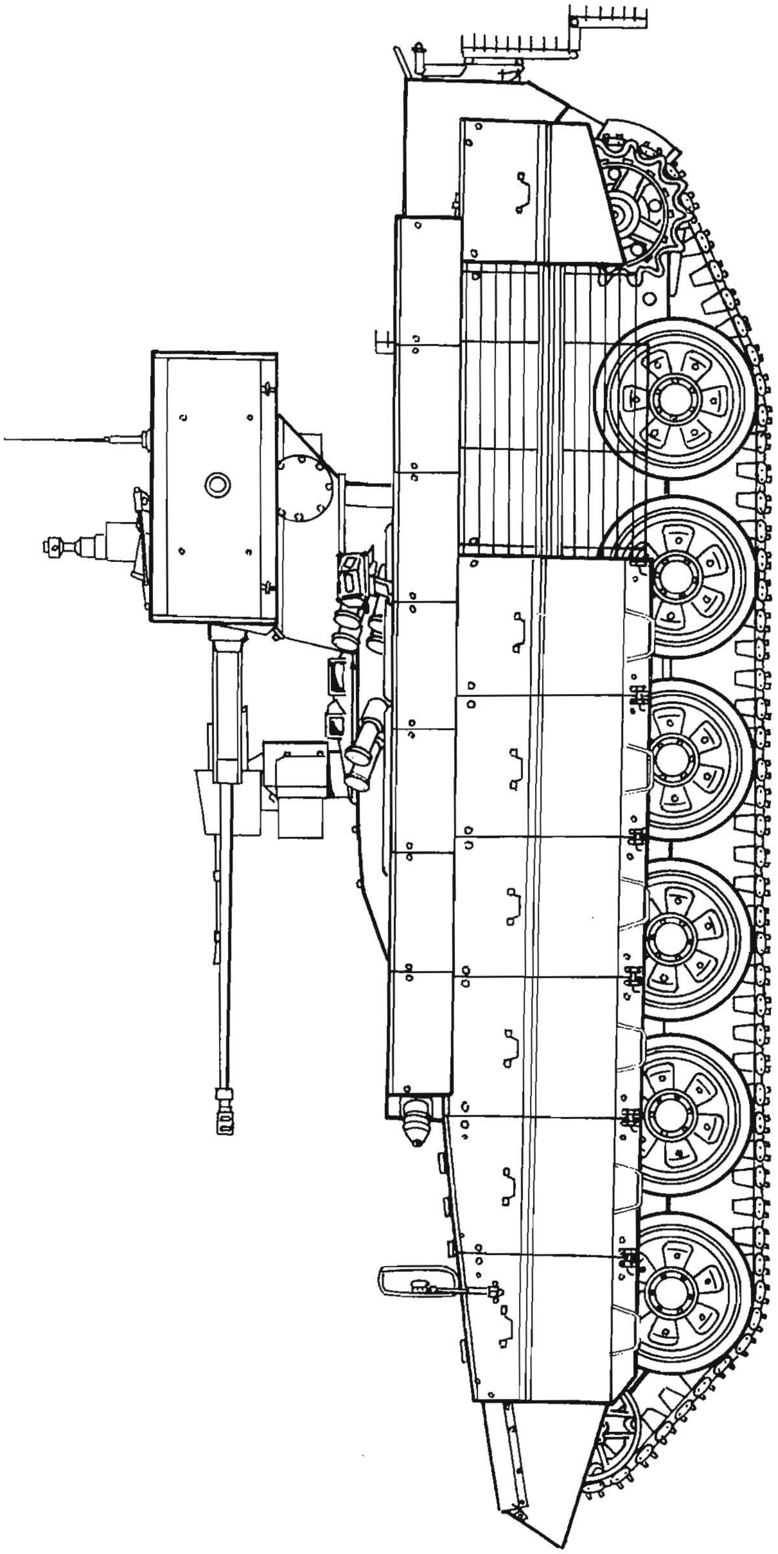


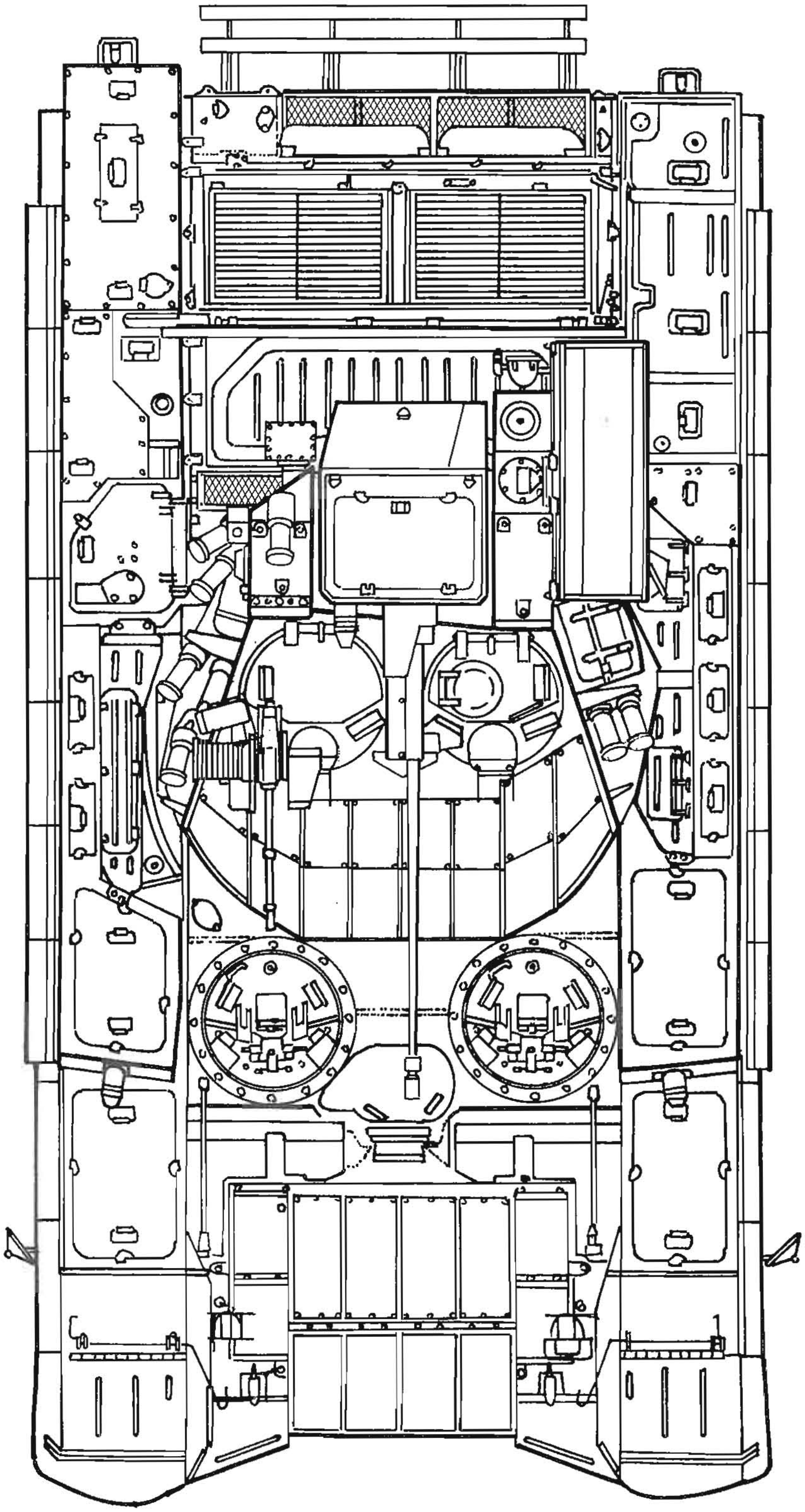
This rear view shows the NII Stali grill armor fitted to protect the engine.

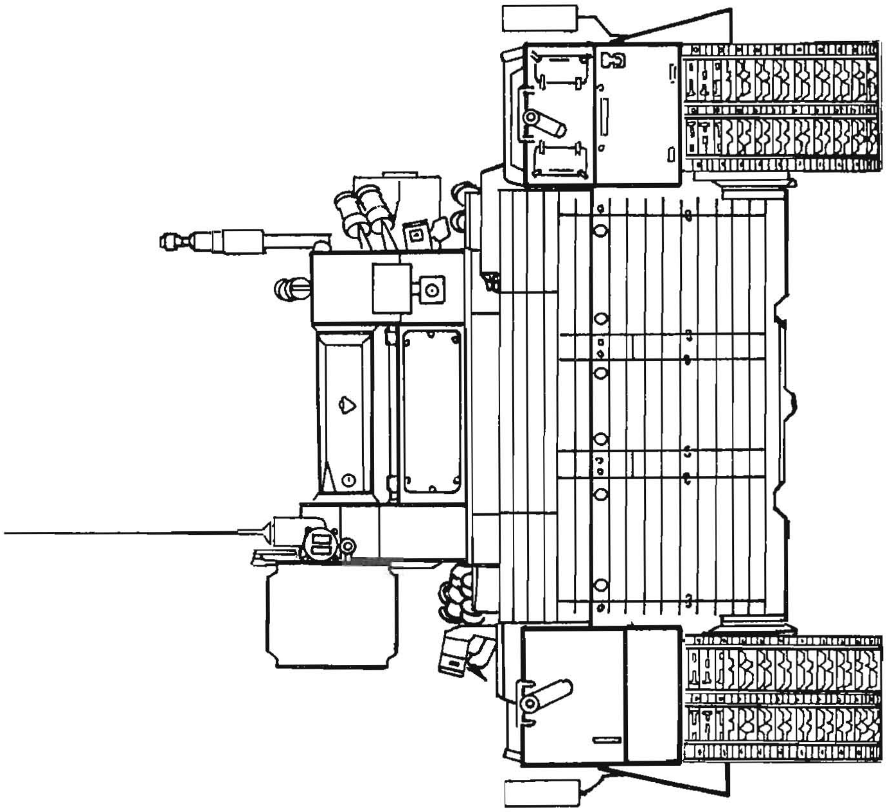


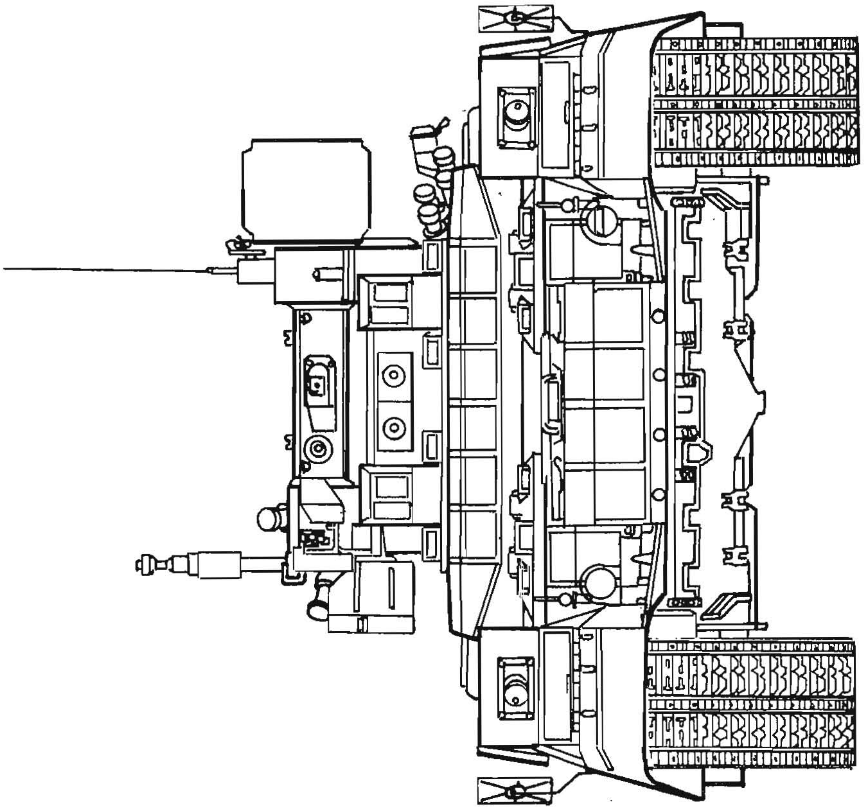
The box launcher for the 4 Kornet missiles might seem irreleva urban fighting. However, the Kornet can be fitted with a thermobaric, fue explosive warhead. This has a devastating effect when fired into build

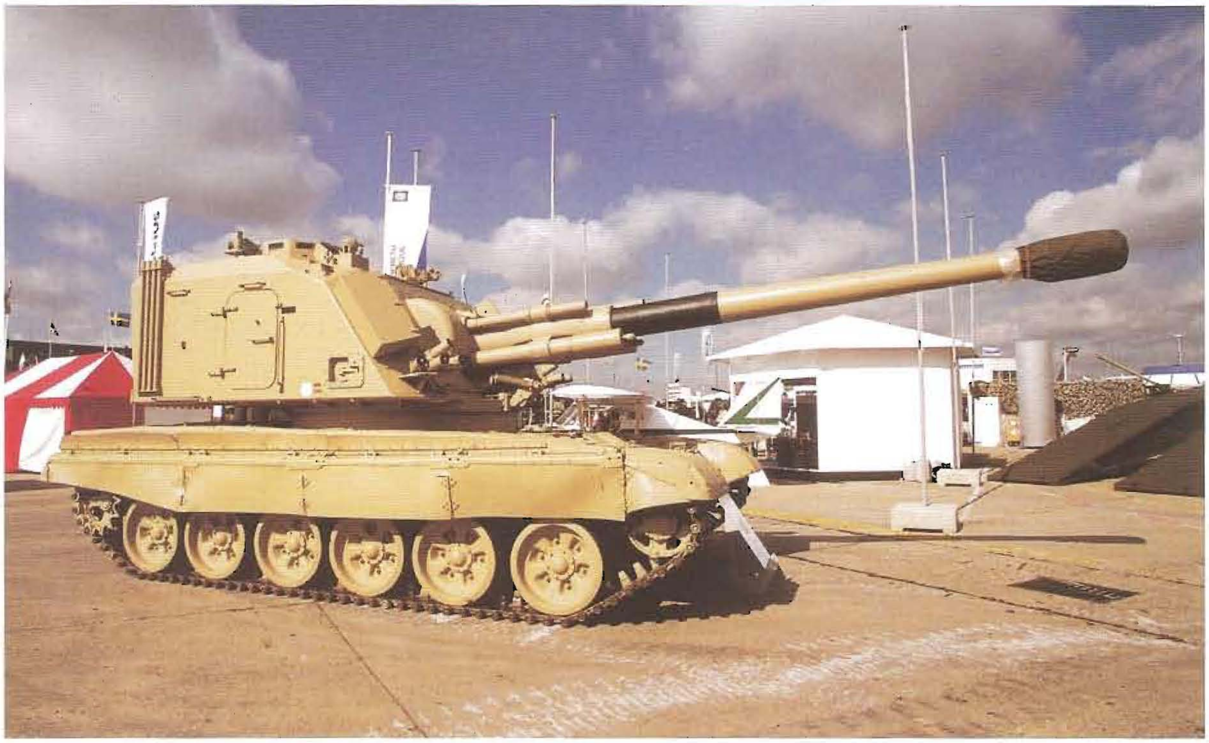
1/35 BMPT



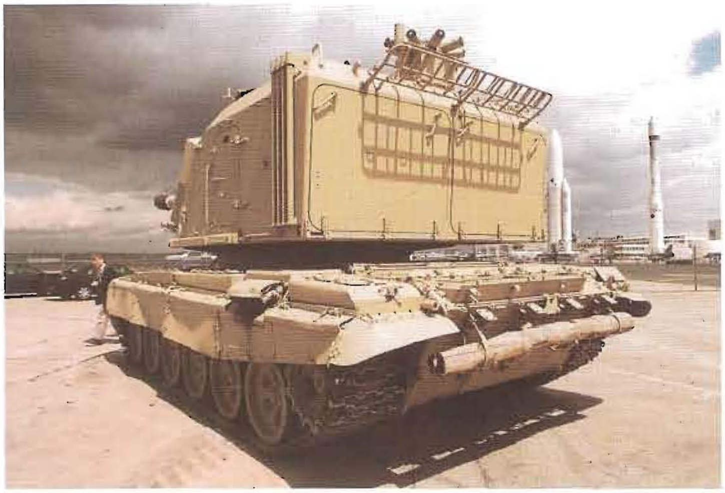




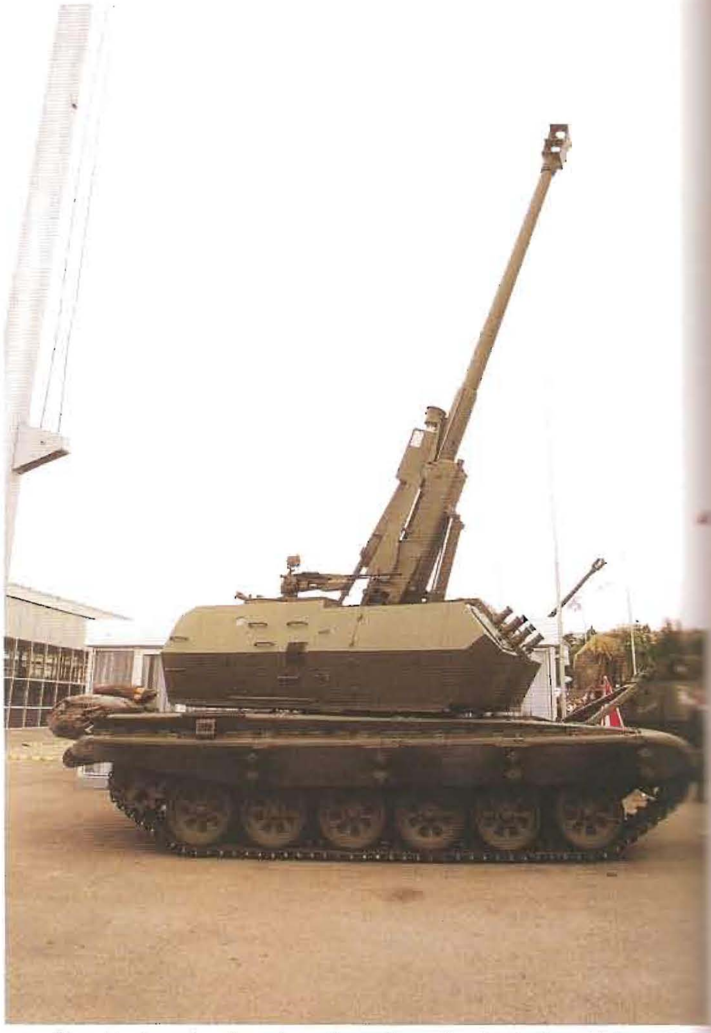




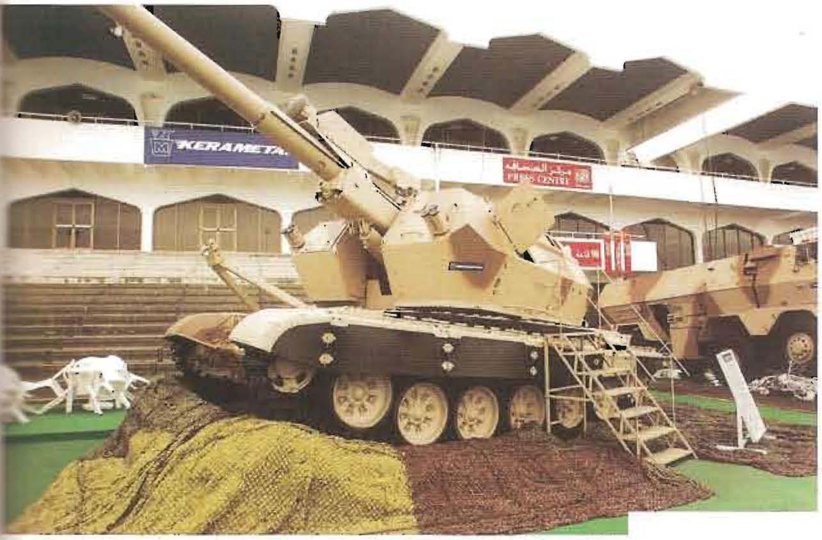
A number of cou including India have requirement for a new propelled 155mm gun NATO-compatible ammun GIAT in France has devel this vehicle which transfers 155mm gun from the AM chassis to the T-72M hul used in India.



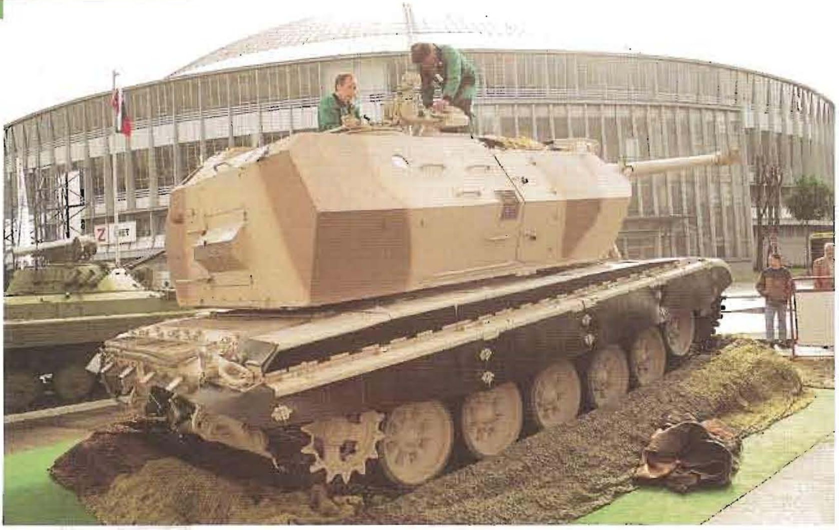
As is evident from this rearview, the French 155mm self-propelled gun on the T-72M chassis uses a turret almost identical to that used in the French Army.



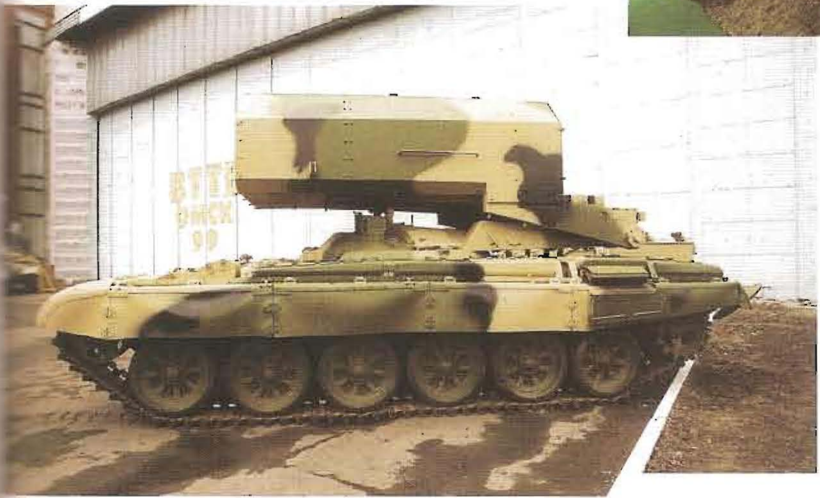
Slovakia has developed another alternative for India which uses turret from the 155mm A-40 Zuzana on the T-72M chassis. The Zuzana



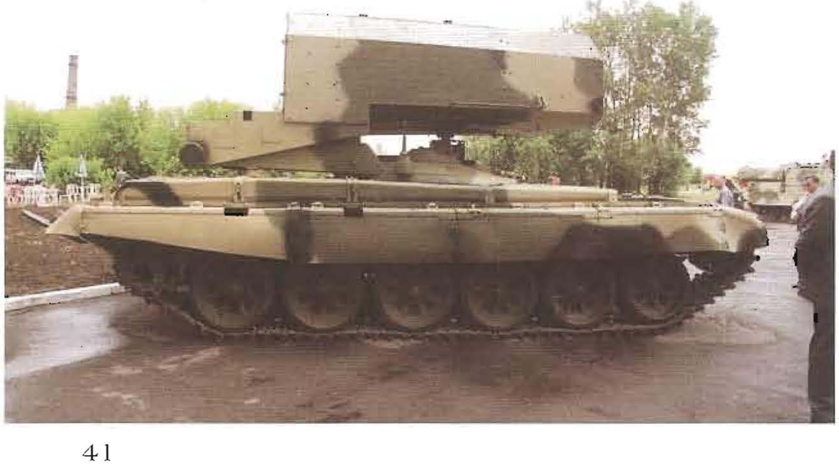
This front view shows several intriguing details of the A-40 Zuzana combination including the new barrel lock on the hull front, and the small radar fitted above the main gun tube which is used to monitor projectile speed and dispersion to improve the gun's long-range accuracy.



This rear view shows that the A-40 Zuzana combination es a largely unmodified T-72M hull as its chassis. This is an rtant consideration in the Indian competition since India ufactures the T-72 hull as the Ajeya.

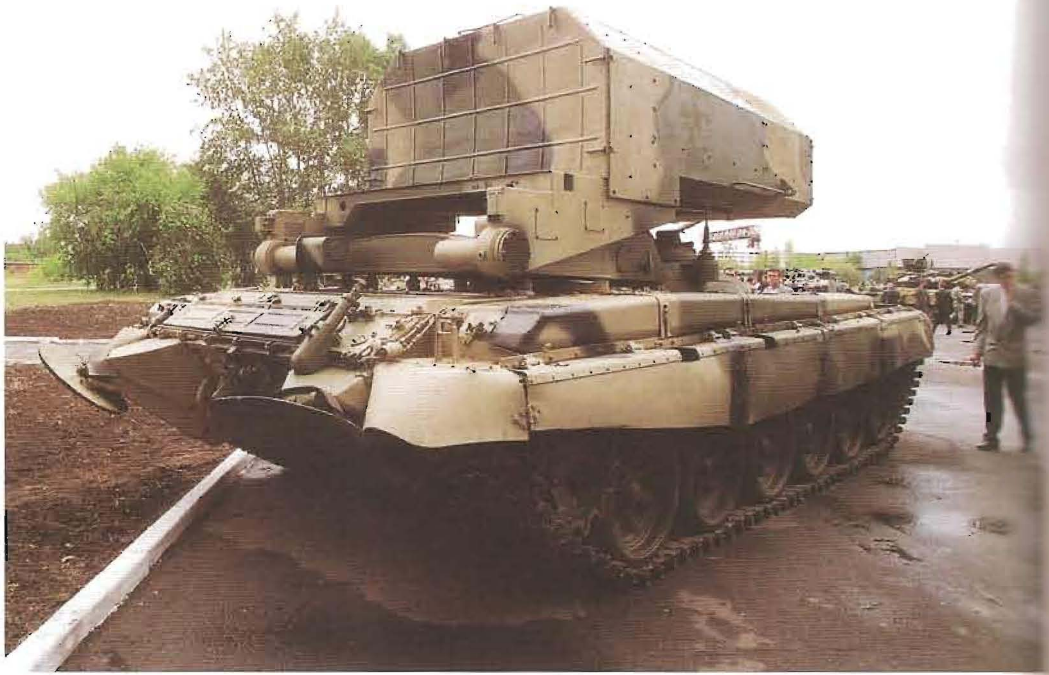


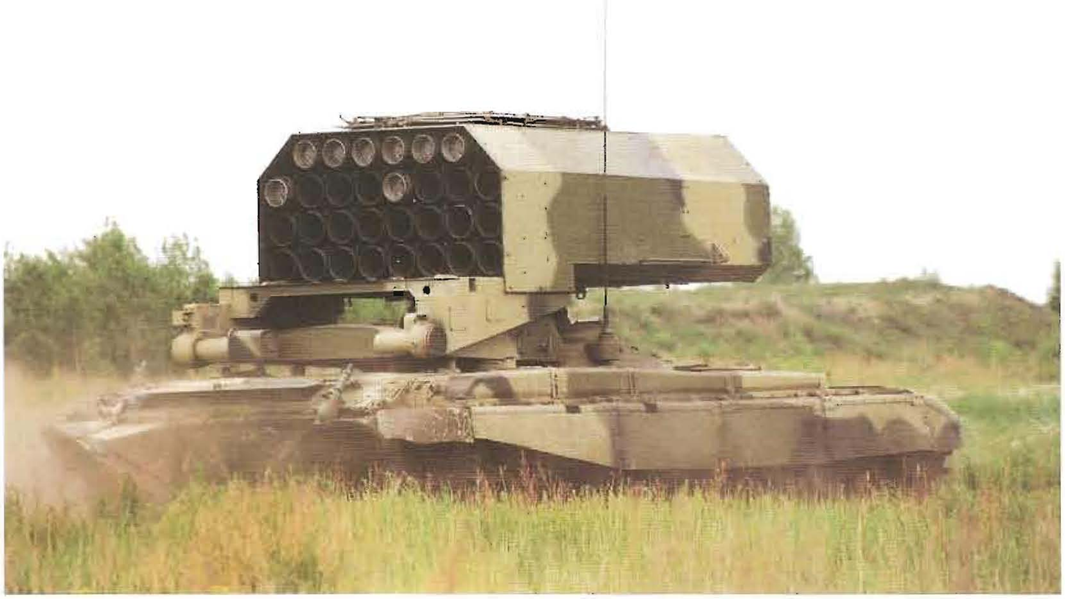
One of the most unusual T-72 artillery vehicles is the TOS-1, which translates literally as "Tank Flamethrower System". In fact, the rockets fired by the TOS-1 use a thermobaric fuel-air explosive warhead which the Russians sometimes euphemistically call a flame warhead.



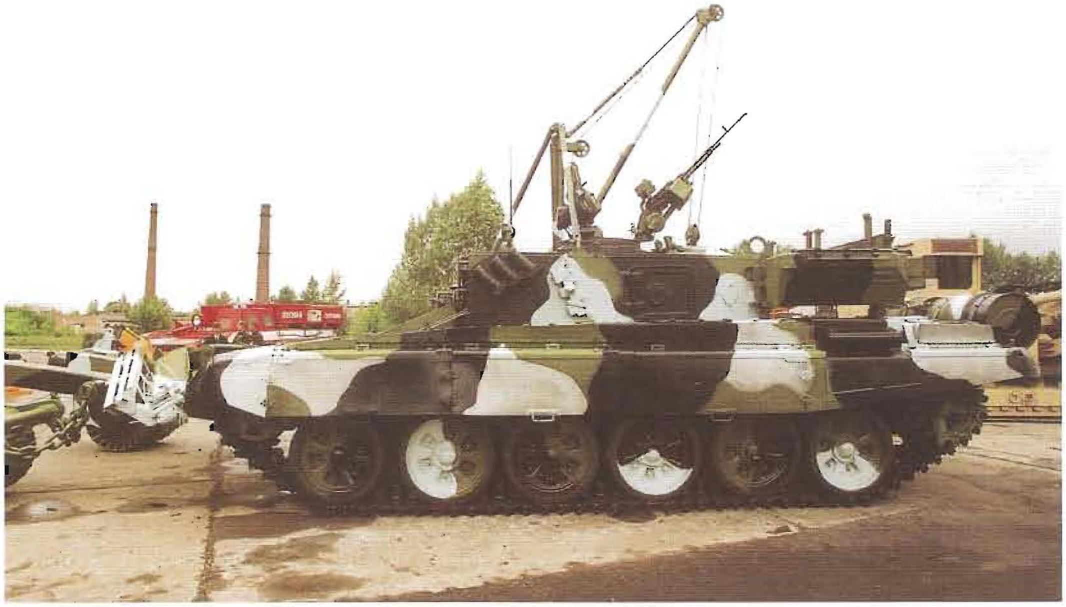
This right side view of the TOS-1 shows that it uses a al T-72A chassis. This weapon system was developed in 1980s as a method to field a weapon with extremely heavy wer against troops in lightly built-up areas such as towns.

This rearview shows details of the launcher. The TOS-1 is armed with thirty 220mm rockets. These can be salvoed in 7.5 seconds. The rockets have a range of 400 meters to only 3.5 km, making it more of a close-support weapon than a conventional artillery system.

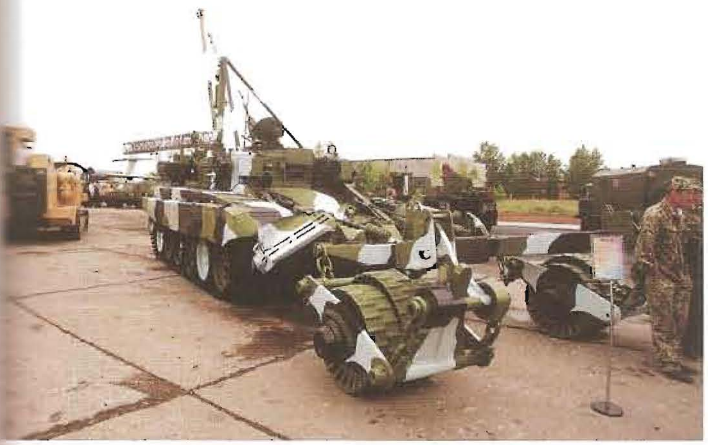




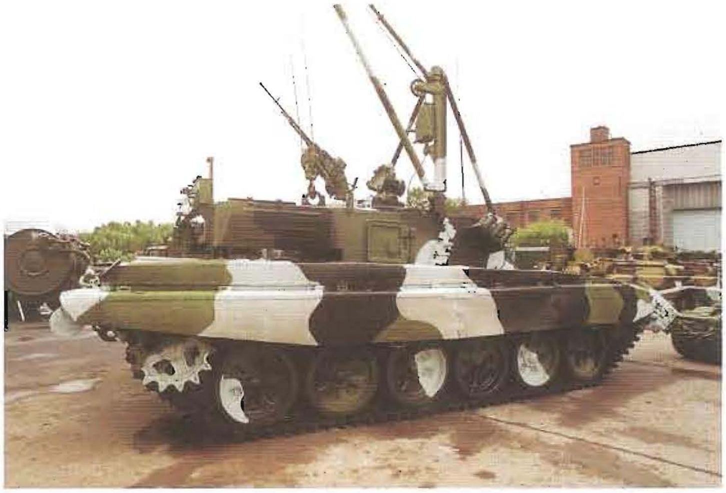
This view shows the TOS-1 mo out to the firing range with eight o thirty launch cells loaded.



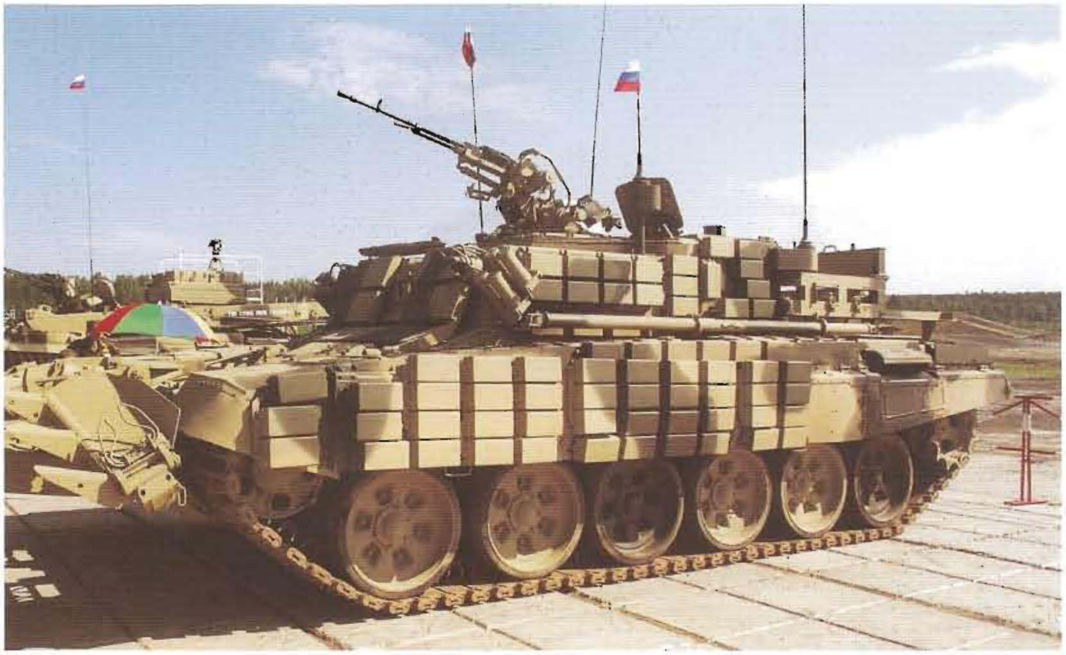
Soviet units in Afghanistan found they needed a dedicated combat gineer vehicle for minefield clearing ce the usual tank mine roller binations had many drawbacks. s resulted in the BMR-3 minefield ring vehicle on the T-72A chassis. s is a fairly rare vehicle type and is here while on display in Omsk.



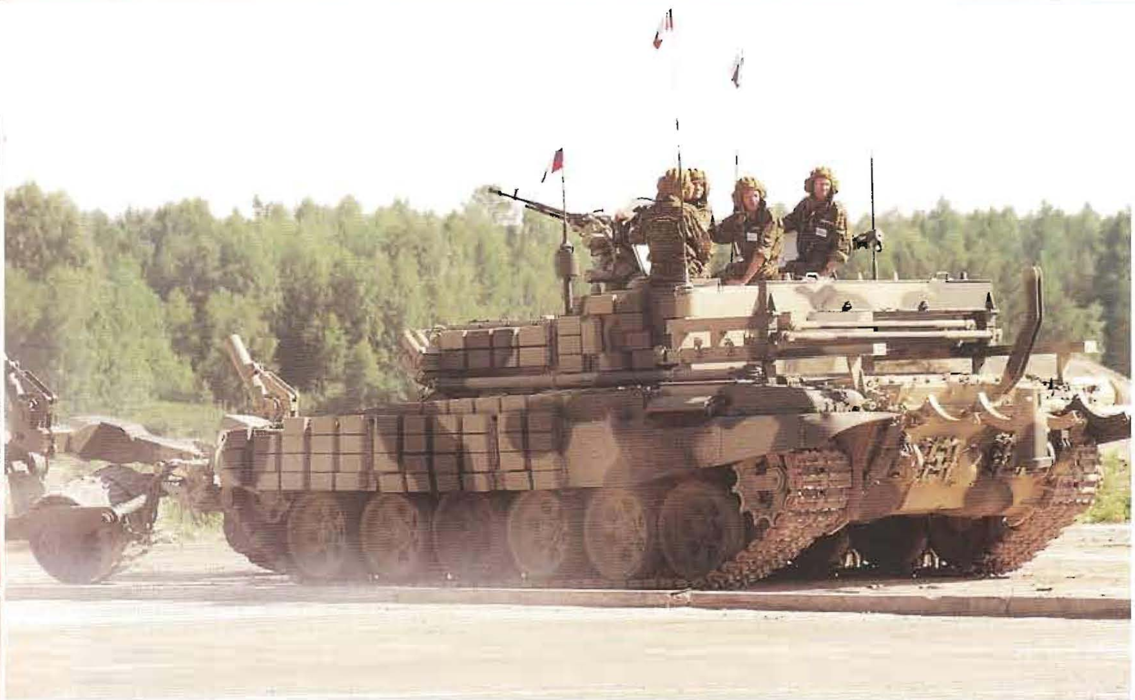
The BMR-3 uses the KMT-7 mine sweeping set which includes both llers and a mine rake. The vehicle can move through minefields at a speed 12 km/h.



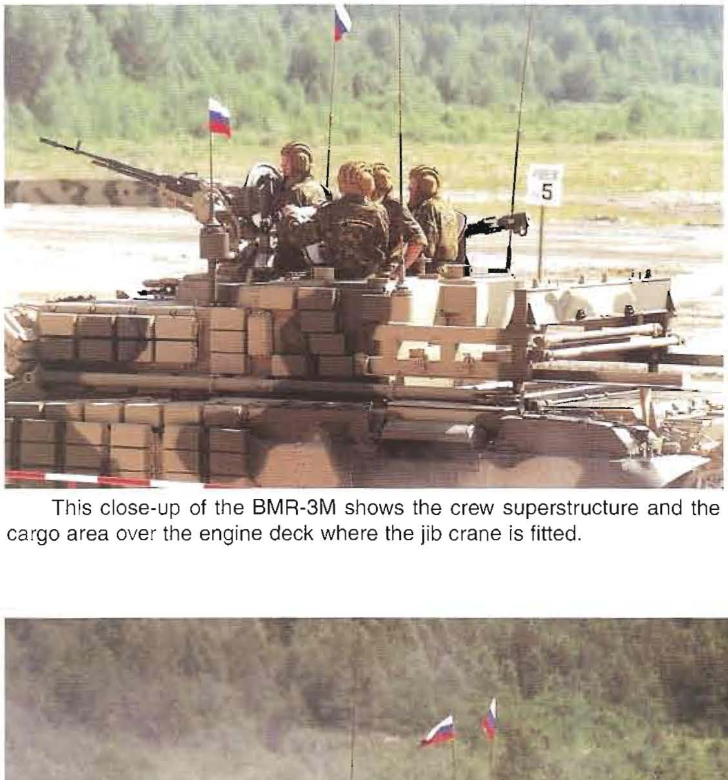
The BMR-3 has a cargo platform on the rear behind the crew compartment for stowing tools and other equipment. There is also a 2.5 ton jib crane for lifting objects into the cargo platform or carrying out other tasks.



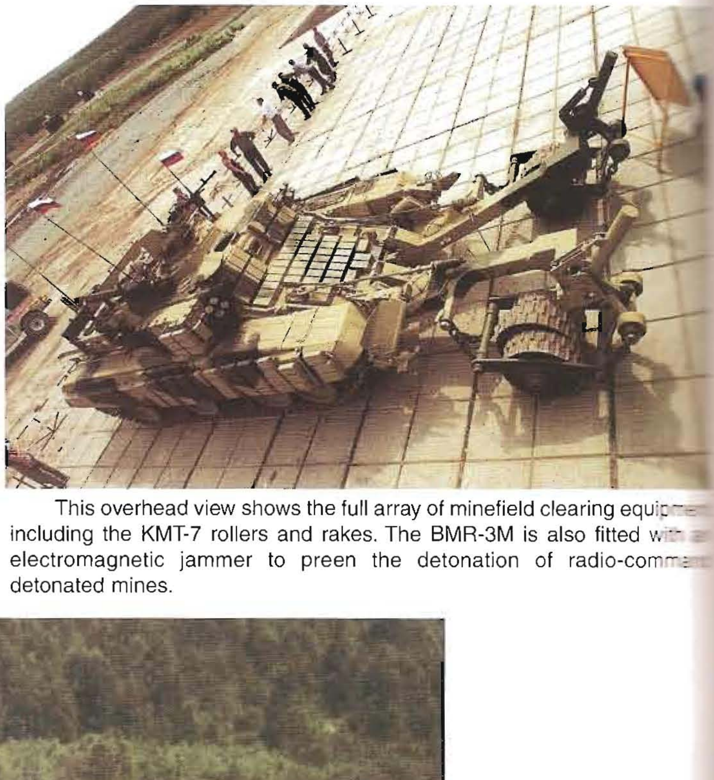
The BMR-3 was followed by the R-3M. This version is fitted with ntakt ERA to protect the crew and ses a newer T-72 hull fitted with the rated V-84MS 840 hp engine.



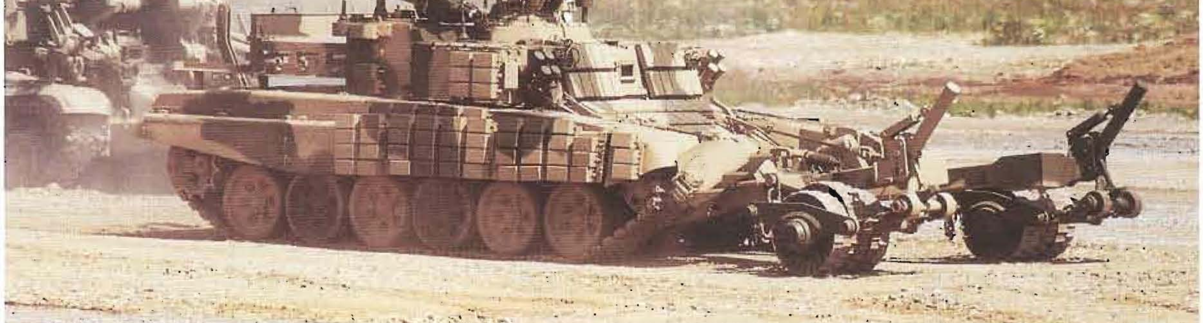
This BMR-3M is fitted w
newer pattern of track also use
current T-90 tanks. In this view,
crane is folded away, with the
vertical post being carried along
hull side.



This close-up of the BMR-3M shows the crew superstructure and the cargo area over the engine deck where the jib crane is fitted.

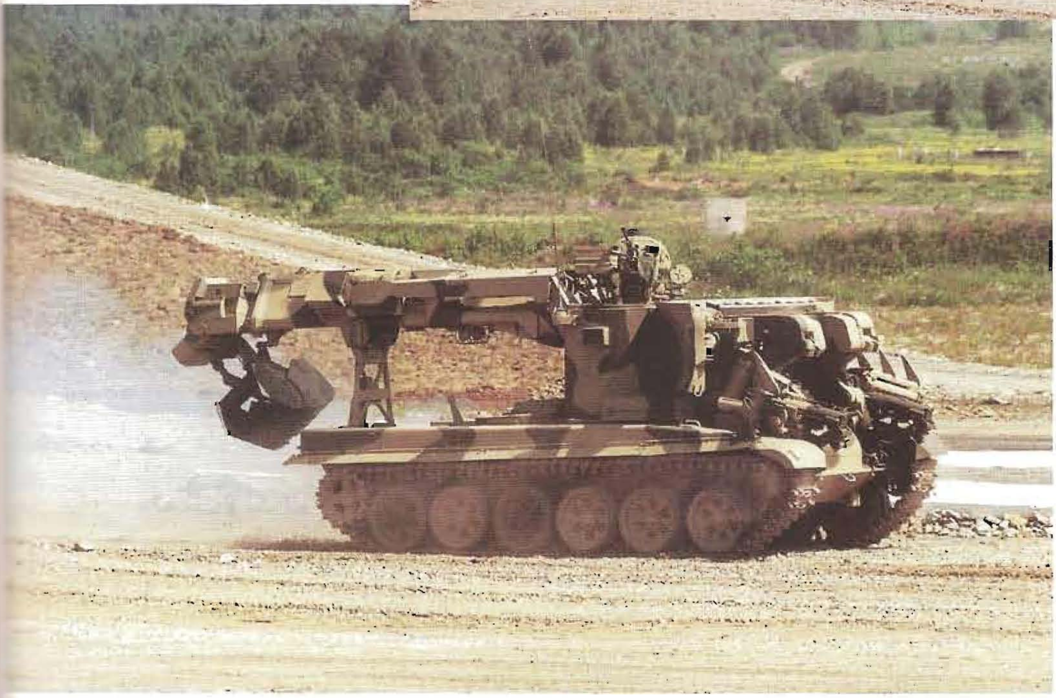


This overhead view shows the full array of minefield clearing equip
including the KMT-7 rollers and rakes. The BMR-3M is also fitted w
electromagnetic jammer to preen the detonation of radio-comm
detonated mines.

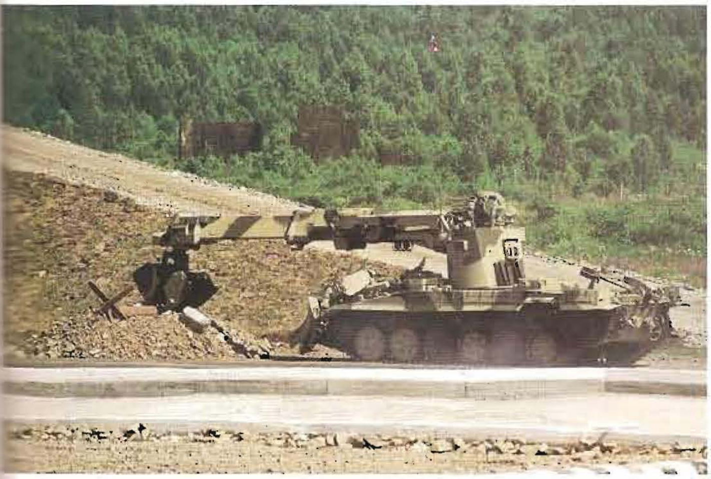


A BMR-3M mo

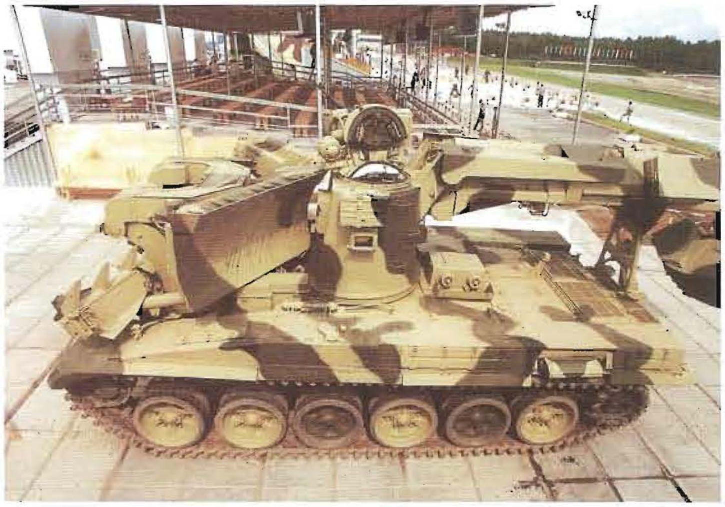
Minefield clearing operations are always dangerous, and often quite dramatic as this demonstration shows.



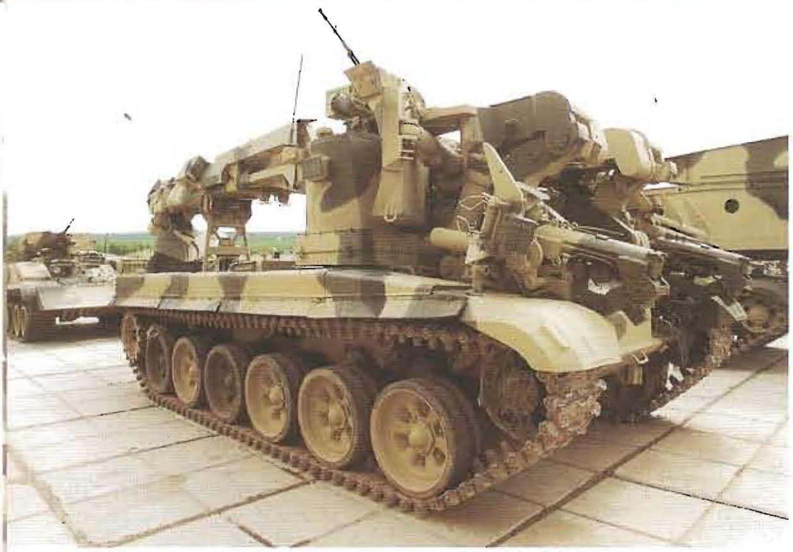
A frequent companion for the BMR-3M is the IMR-2MA, the latest in family of combat engineer vehicles. This is a follow-on to the IMR-2 that was based on the T-72S hull.



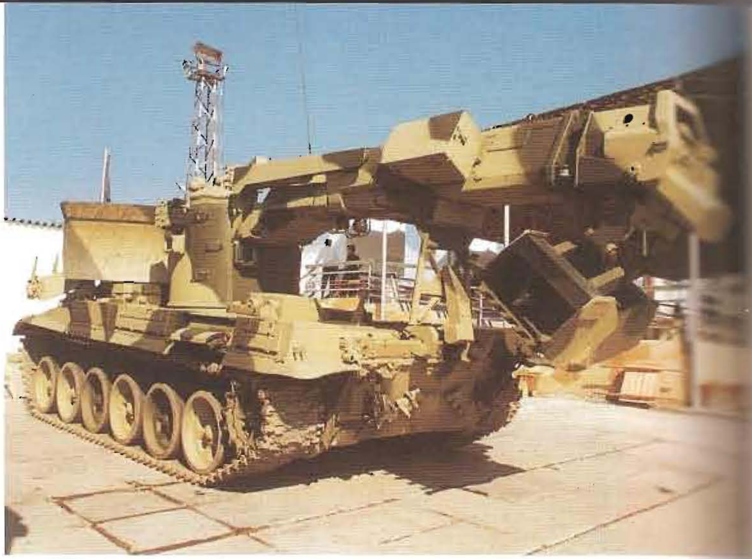
The IMR-2MA is used for clearing obstacles using its telescoping anipulator arm. The shovel bucket can pick up objects up to 2 tons. The R-2MA is also fitted with a dozer blade for clearing obstructions or eating emplacements.



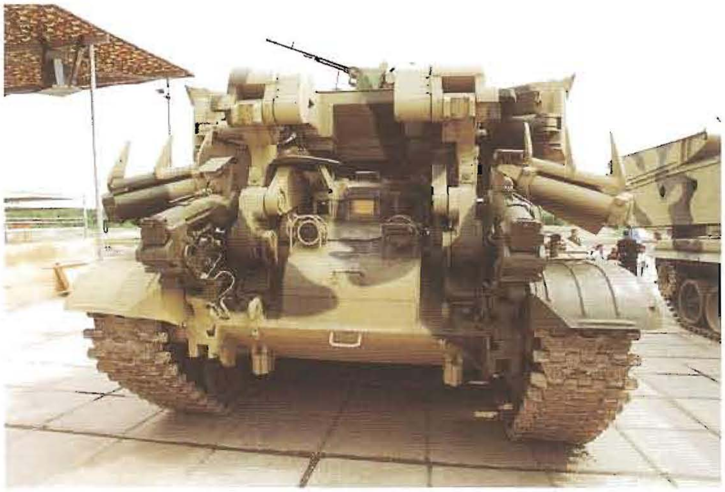
This overview shows the IMR-2MA in travel configuration with the dozer blade folded up and the manipulator arm locked over the rear and the working arm retracted.



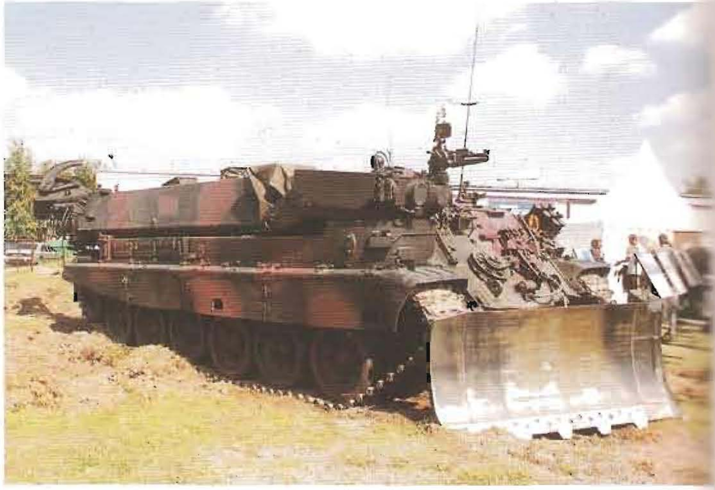
Evident on the corner of the IMR-3MA is a pair of mine rakes which can be used for vehicle protection during combat engineer missions.



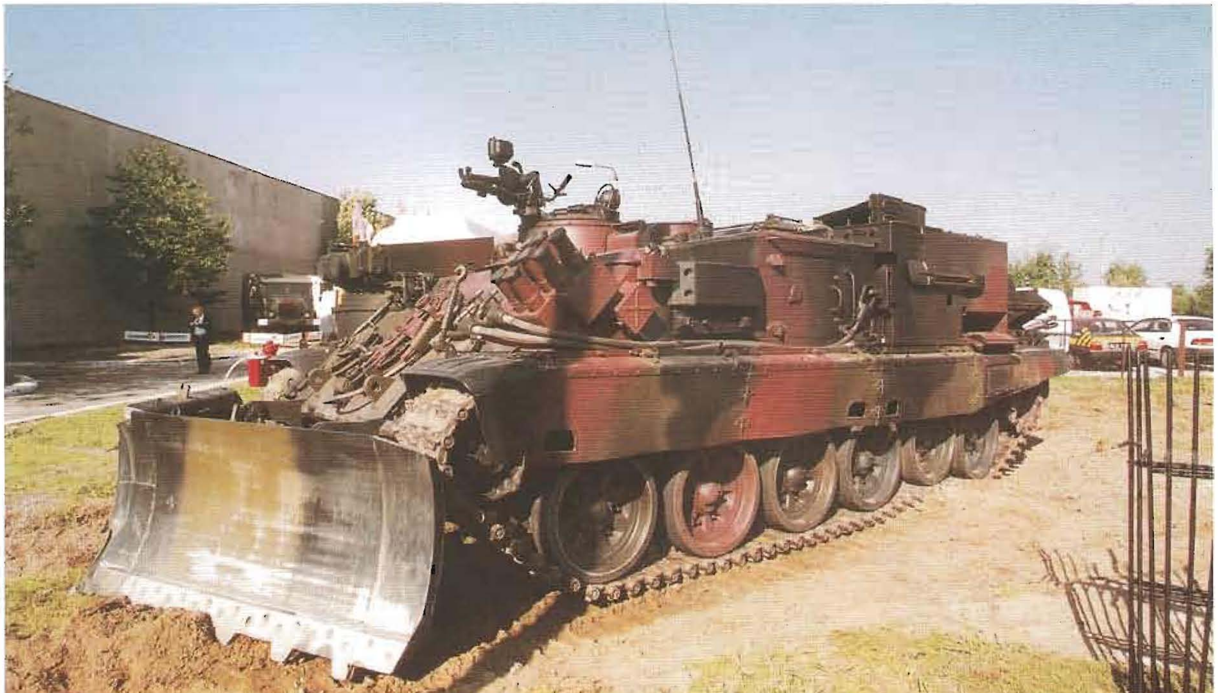
This detail view shows the large manipulator arm of the IMR-3MA
used mainly for clearing obstructions during mechanized combat miss



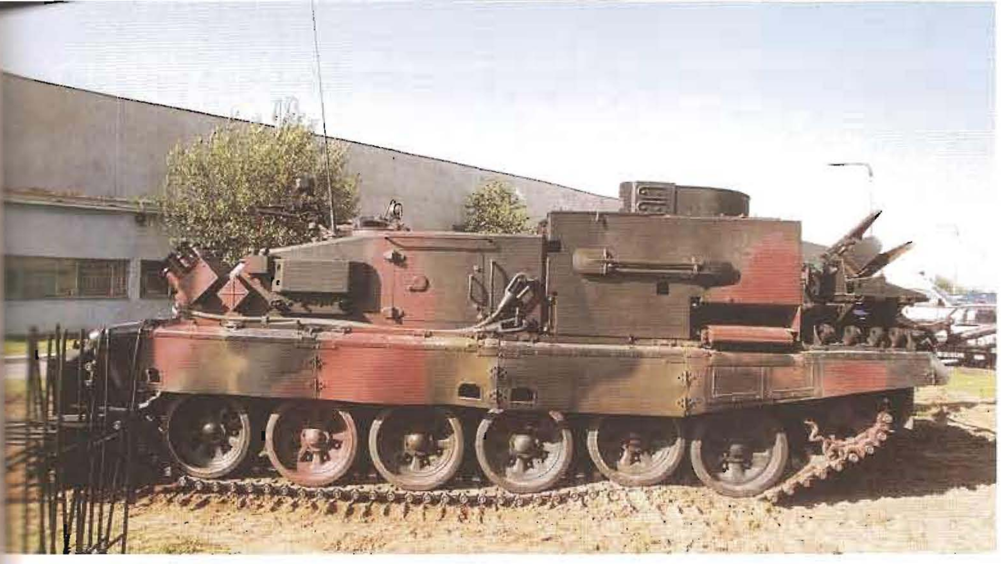
This provides a clear view of the complicated structure of the hydraulically operated dozer blade assembly on the bow of the IMR-3MA.



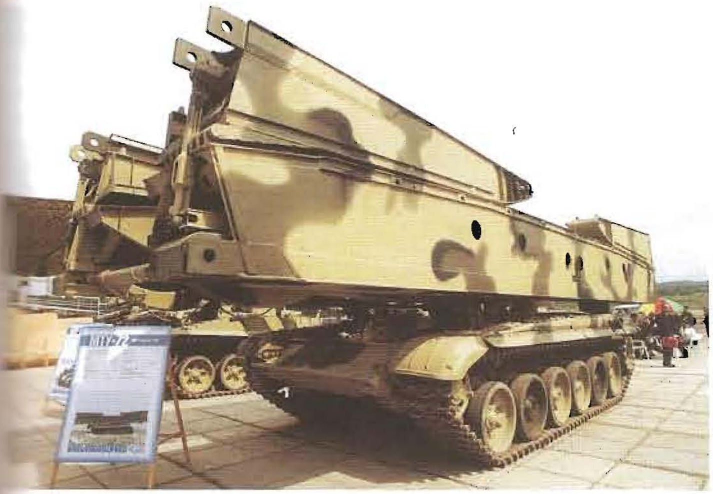
In contrast to the Russian IMR-2, the Polish MID places the manipu
arm on the right side of the chassis instead of in the center. This per
space for a superstructure for the crew and other tools including a winc



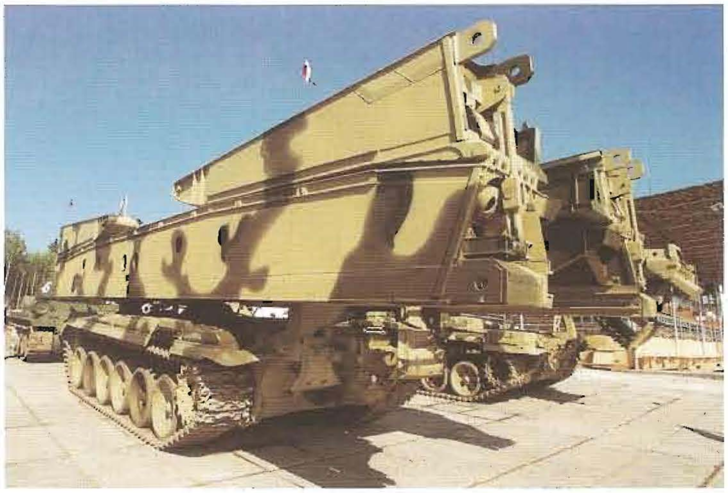
Poland produc
its own com
engineer vehicle on
T-72M chassis ca
the MID. Like the I



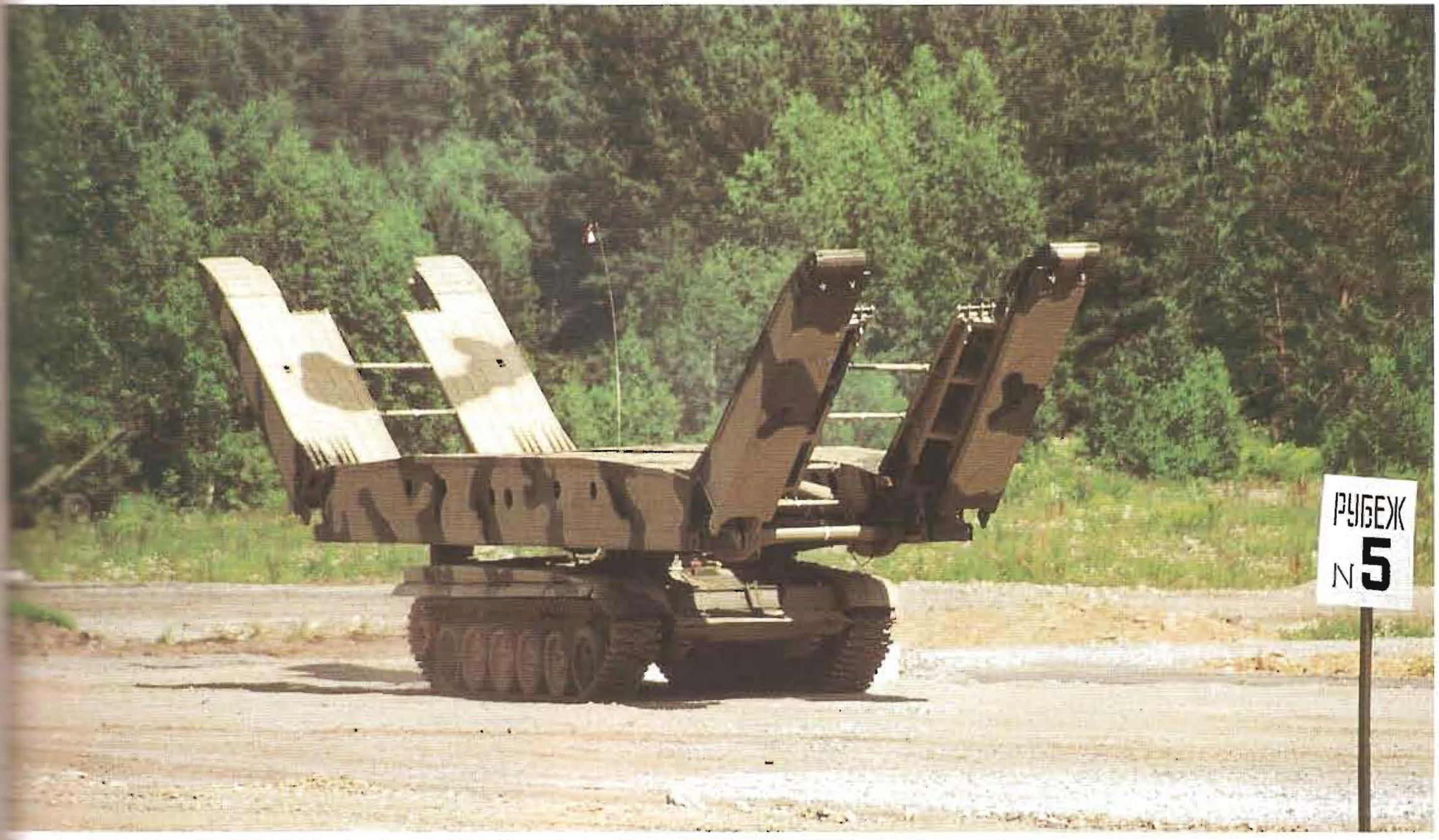
This left side view shows the added superstructure as well as the rear cargo platform fitted over the engine deck of the MID.



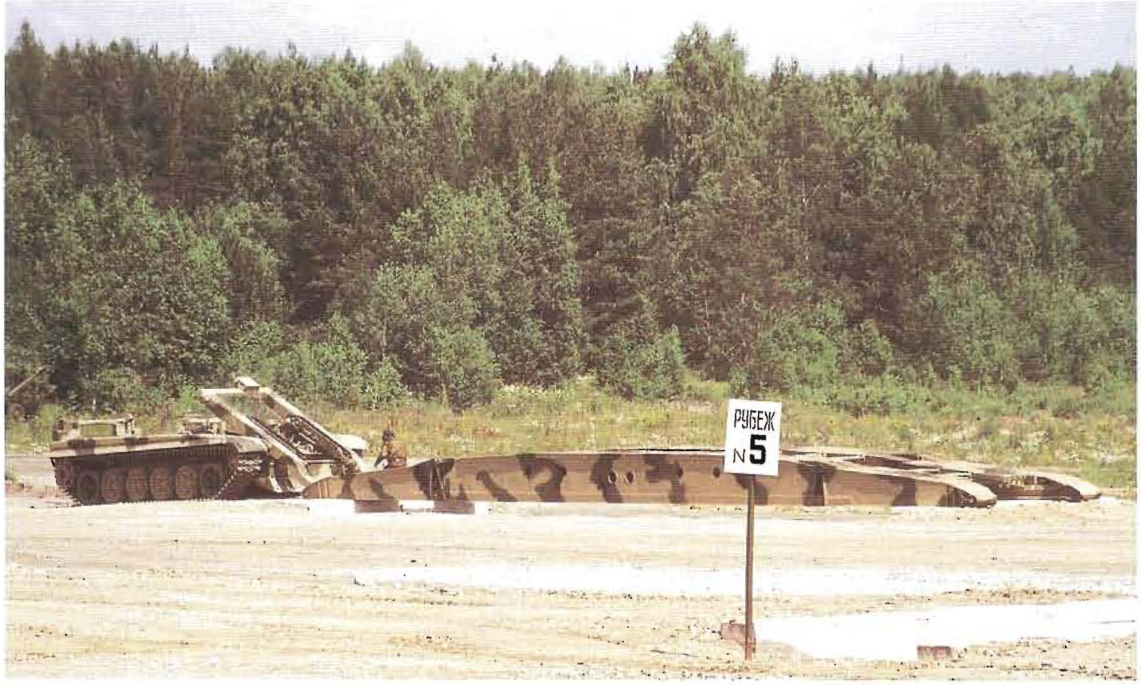
The MTU-72 is the standard bridge-laying version of the T-72 tank. It is tended to cross gaps such as tank traps and other obstructions.



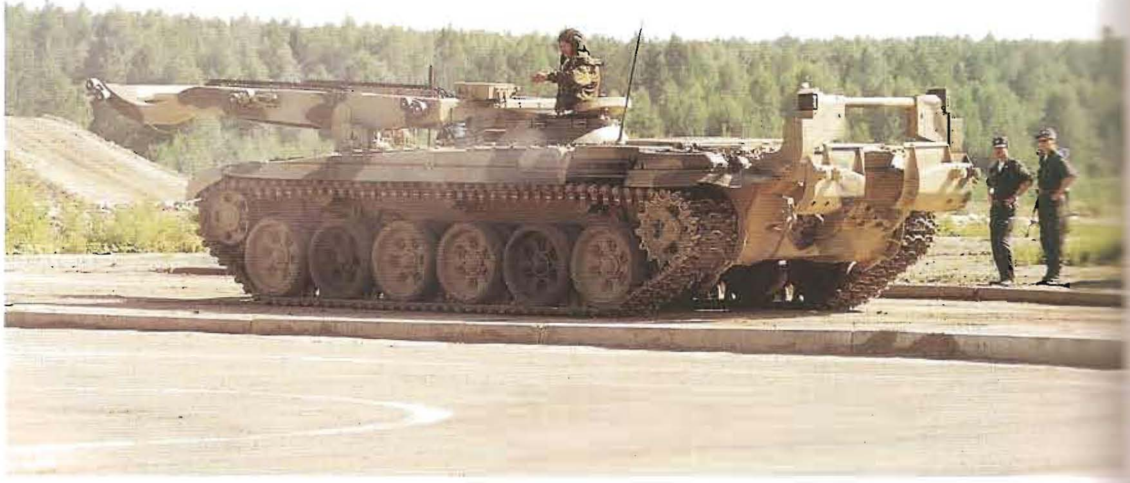
This is a rearview of a MTU-72 in the travel configuration with the bridge ends folded up.



deploy the bridge, the MTU-72 begins by unfolding the outer sections of the bridge using hydraulic controls.

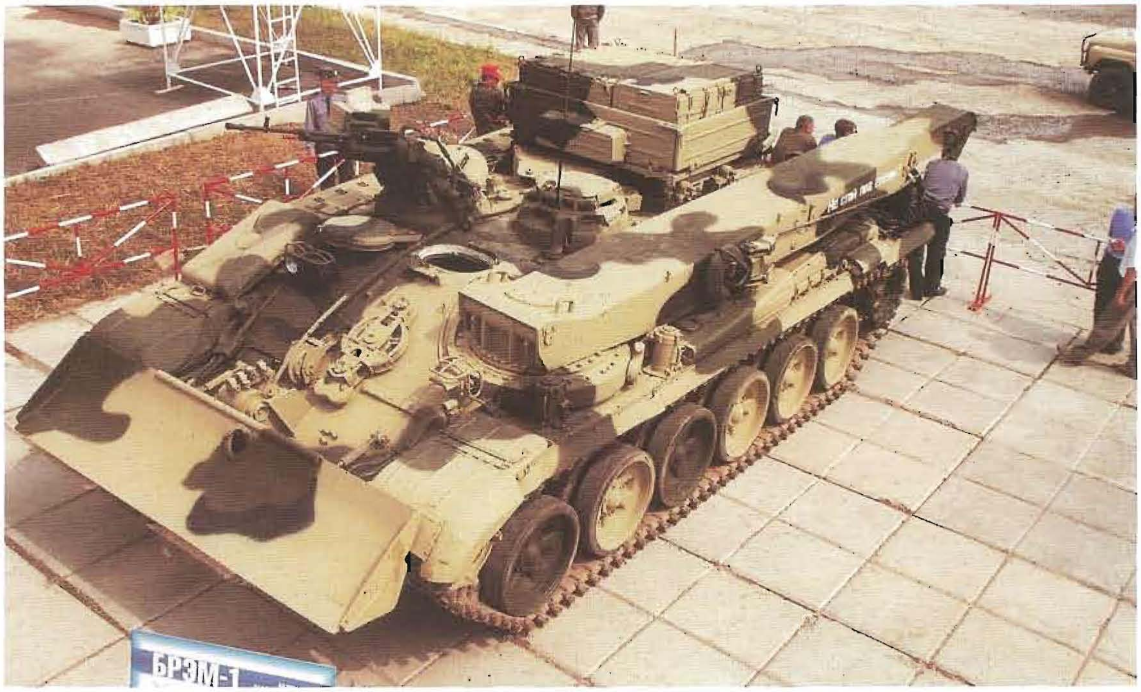


Once extended to its full 20 meter length, the launching arms move the bridge in front of the vehicle.

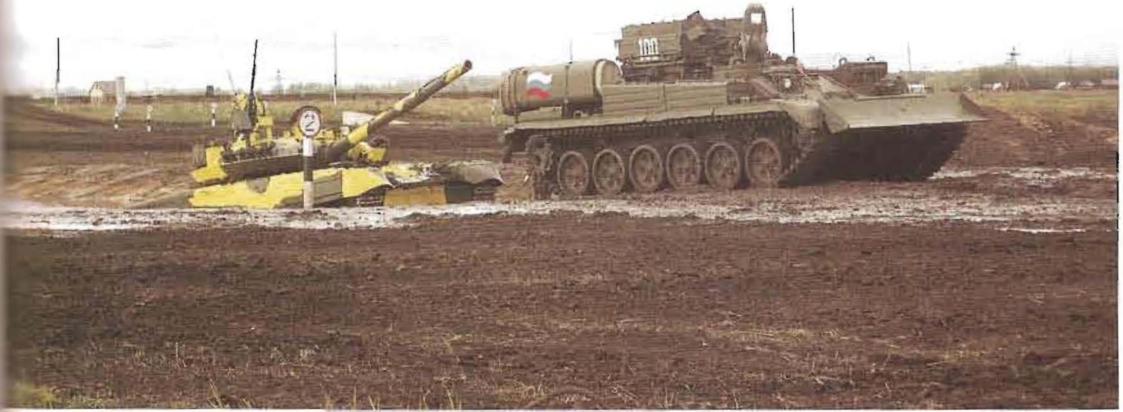


Once the bridge has been deployed, the MTU-72 vehicle can move away to permit tanks to cross the span.

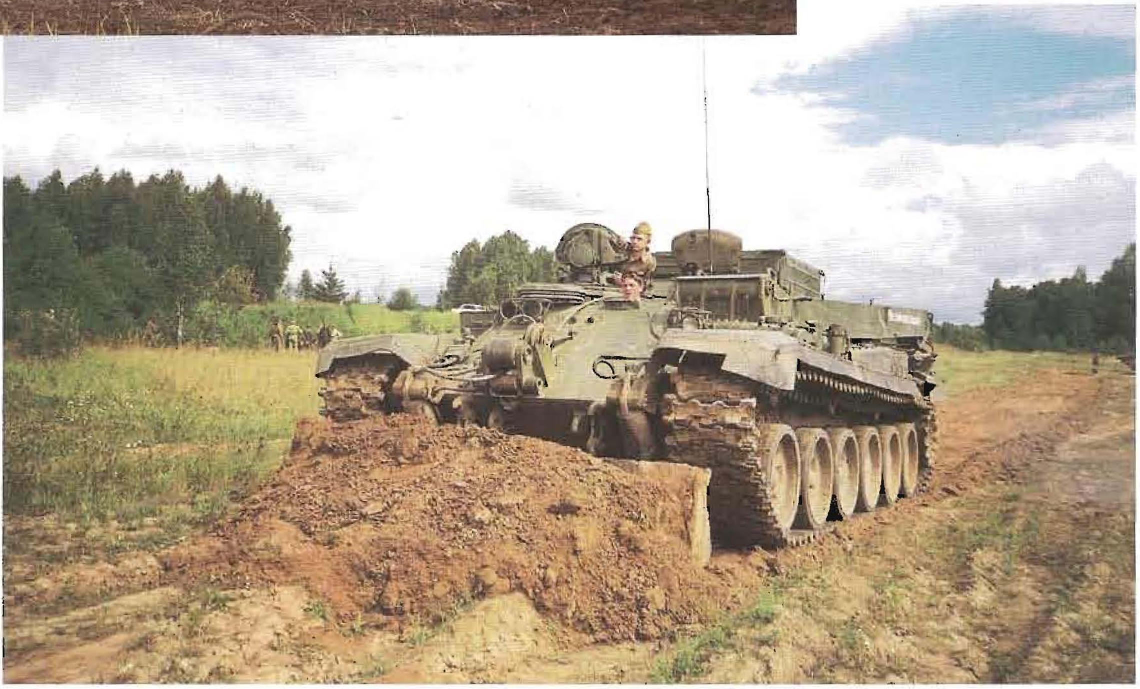
T-72 Armored Repair and Recovery Vehicles



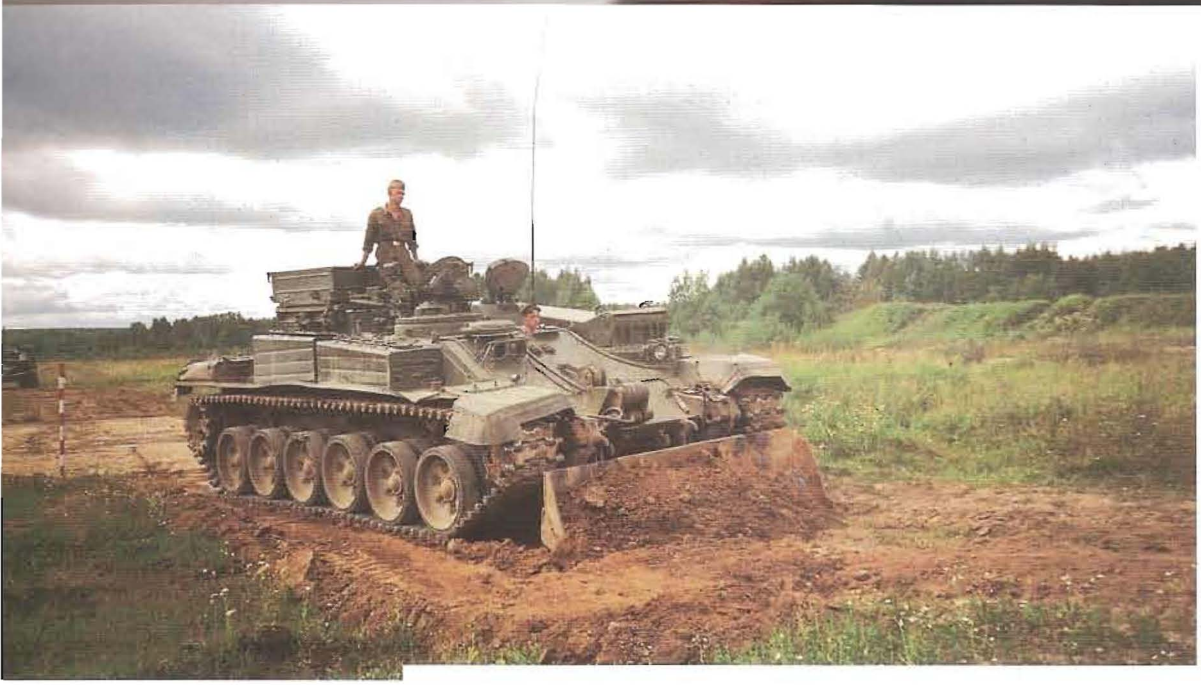
The standard armored
epair and recovery vehicle in T-
2 and T-90 tank units is the
REM-1 armored repair and
covery vehicle. The vehicle's
ane on the left side can lift up
12 tons such as tank engines
d transmissions.



The BREM-1 is also fitted with an internal winch for recovering armored vehicles. In this case, it is seen extracting a T-80U from a water obstacle during a demonstration near Omsk.

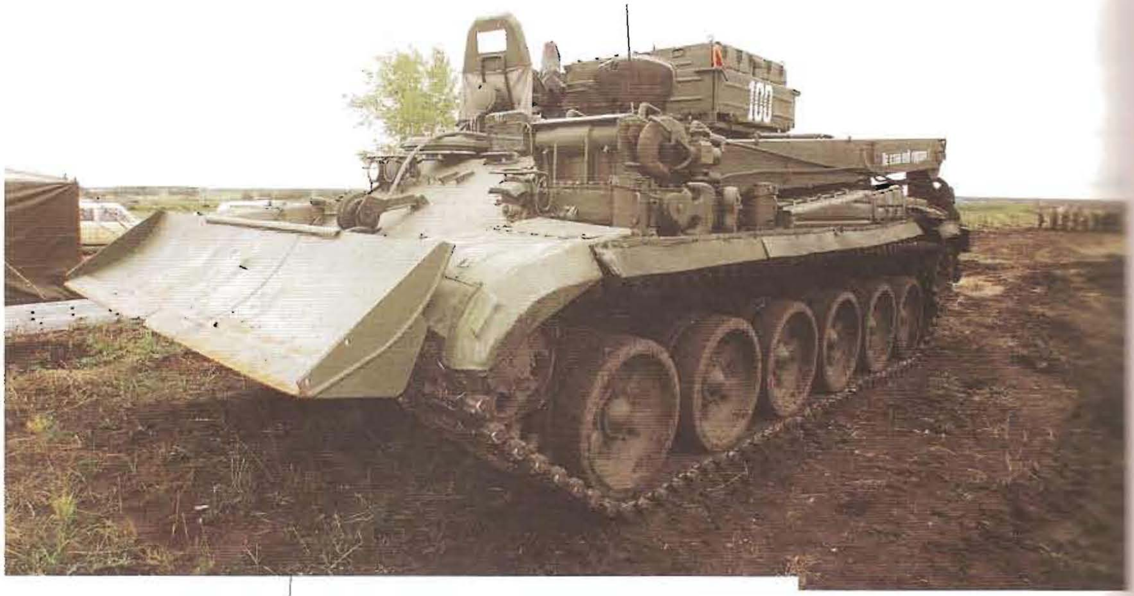


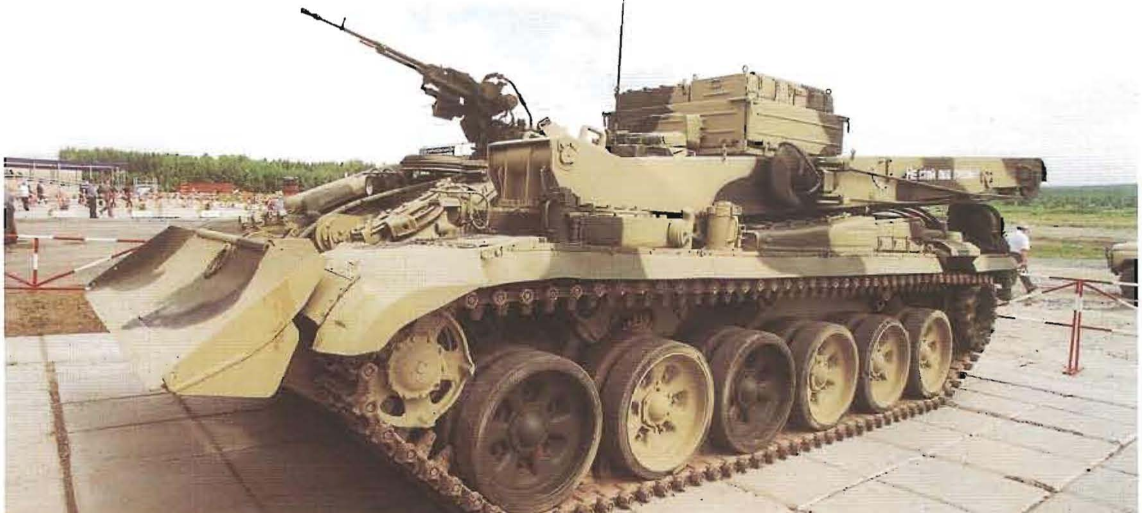
The BREM-1 is a versatile
cle and often used for light
neering tasks such as bull-
ng paths as seen here at
nka. (Jim Kinnear)



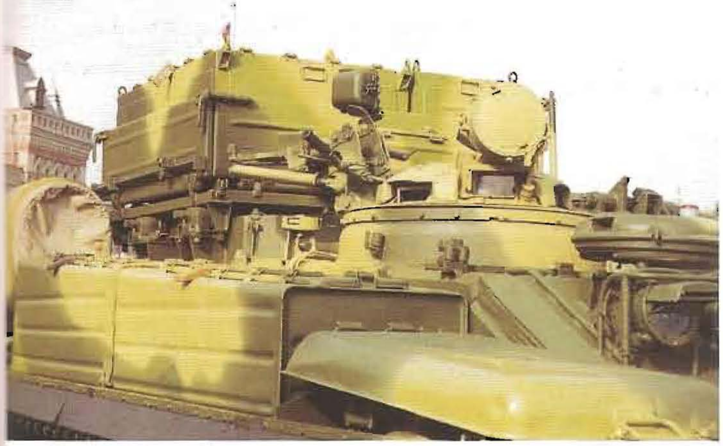
A BREM-1 using its dozer blade. The dozer blade is also used in conjunction with the winch in the case of extracting tanks which are deeply mired in mud.

This is the basic BREM-1 based on the T-72A chassis.

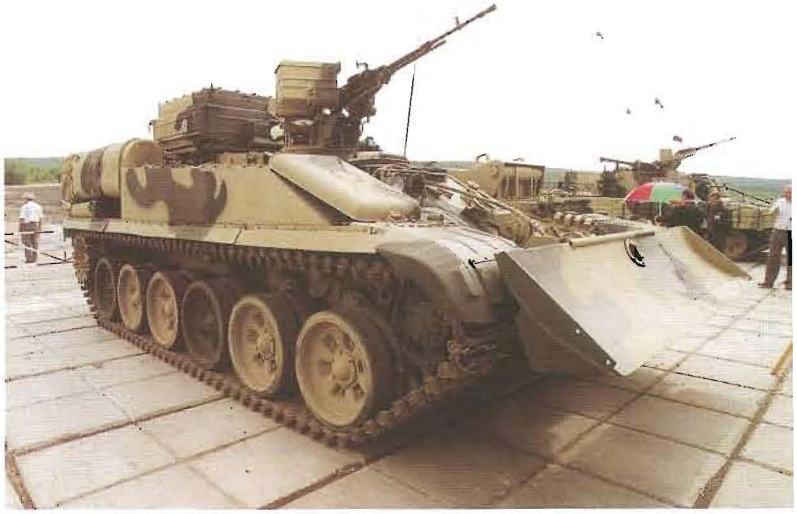




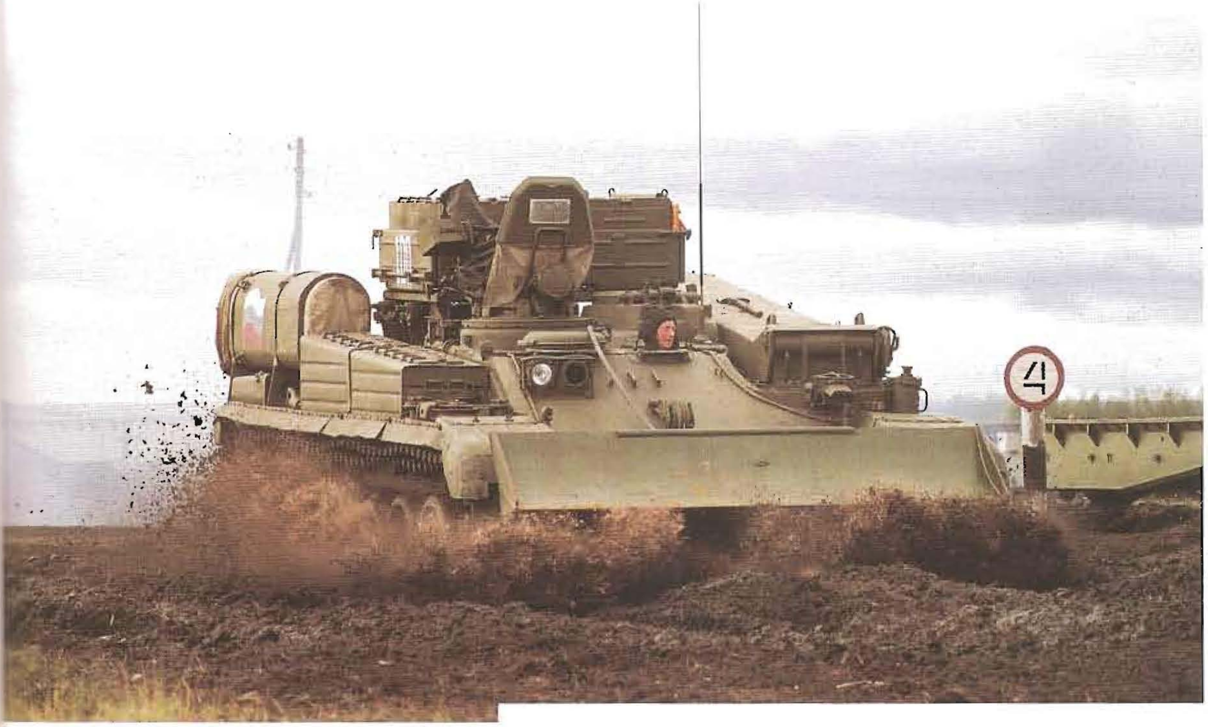
This is the current improved BREM-1 based on the T-72S chassis with uprated engine. This version is also fitted with a remote control machine gun over the



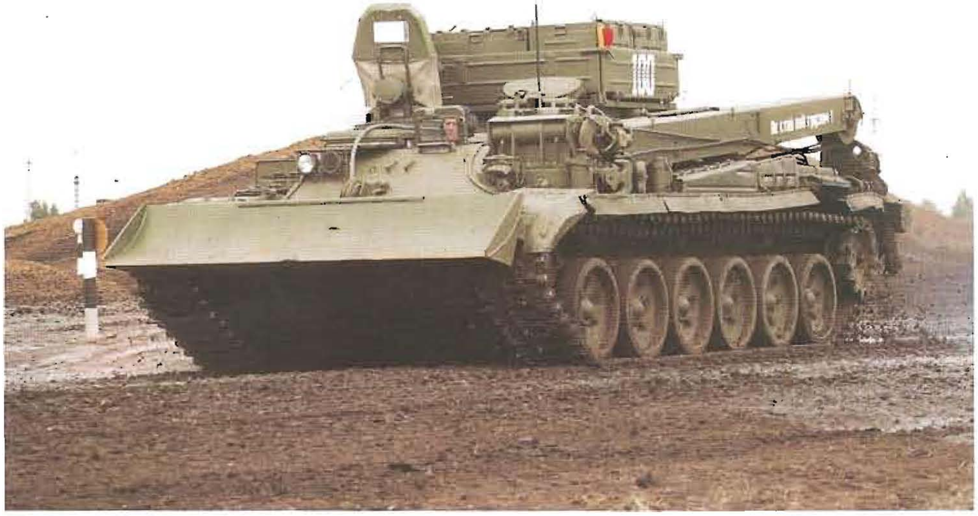
The BREM-1 is fitted with a cargo platform in the center which is used to carry tools or spares. This is a standard production version with the manually operated machine gun on the commander's cupola.



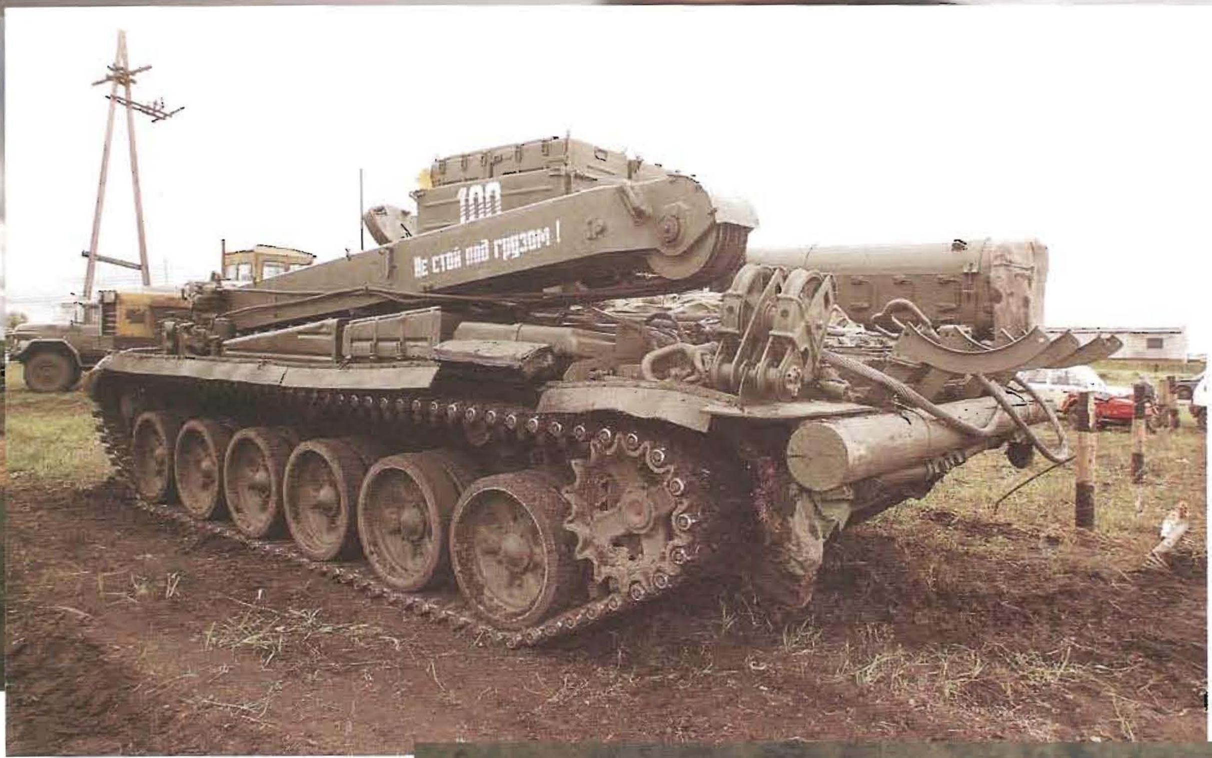
The configuration of the stowage on the right side sponson is somewhat different on new production BREM-1 vehicles like this one seen near Nizhni-Tagil in 2000.



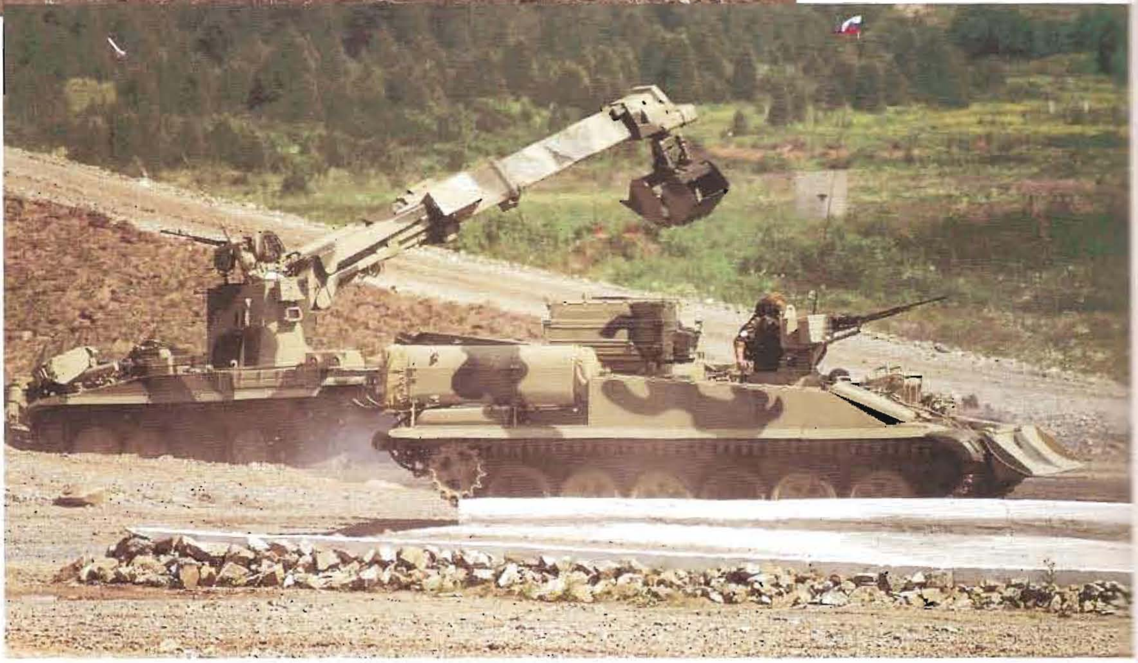
This is a standard production BREM-1 moving across a muddy field during exercises near Omsk in the Siberian military district. The large oval shaped device on the rear sponson contains tubing for the deep fording equipment.



A view of the BREM-1 from the left side. The commander's station is fitted with a weather screen and windshield that is also used on the T-72 tank.

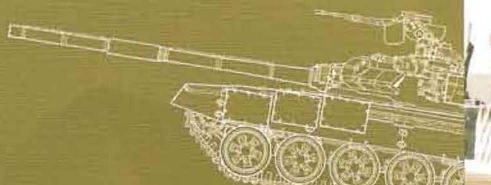


This rear view shows the racks for spare fuel and the assorted tools and pulleys. The stencil on the crane side warns not to stand under the crane when carrying a load.



A BREM-1 moves by a IMR-2MA during field demonstrations near Nizhni-Tagil in the summer of 2000.

Other T-72 manufacturers have developed different types of armored



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